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PIT AND QUARRY

MAY 1948

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The New Holland is adjusted to produce a medium-size product, minus 1" stone at the rate of 90 T.P.H. It is V-belt driven by two 50 H.P. motors.

A capacity of 150 T.P.H. of minus 4" stone can be obtained by using smaller sheaves and setting the horizontal and vertical breaker bars at their maximum opening.

Operator drives 1200 miles to be sure of getting the best equipment for his new plant

When Fred K. Betts III, of Harrisonburg, Va., decided to build a new crushed stone plant, he first decided on each piece of equipment he wanted —then drove 1200 miles to be sure of getting it!

It's significant that a man who knows stone crushing machinery through 34 years association with the business, should decide on a New Holland Double Impeller Breaker... the breaker with *Dual Impact Action.*

Large capacity, high quality, cubical stone is produced by the New Holland ... with a minimum of power and attention. No wonder it justifies the confidence placed in it by Betts and other progressive operators.

Learn more about these efficient Breakers. Investigate Dual Impact Action. Write for the new, illustrated New Holland Double Impeller Breaker Catalog today.

NEW HOLLAND MANUFACTURING COMPANY
DIVISION
NEW HOLLAND MACHINE COMPANY
DEPT. P-3, MOUNTVILLE, PA.

DOUBLE IMPELLER *Breakers* NH NEW HOLLAND

Albany, Ky., No. 2 Plant of Caldwell Stone Co., Danville, Ky. Two "Caterpillar" D13000 Engines power Pioneer crusher.

Fifteen years of steady work is the record of this veteran "Caterpillar" Diesel at Albany, Ky., No. 1 Plant.

"We hardly know we've got 'em"—says the foreman

• Two Albany, Kentucky, plants of the Caldwell Stone Co. produce a total of 1500 tons of crushed limestone as a daily average. At each plant there are two "Caterpillar" Diesel Engines powering the crusher, elevator and screens.

• One of the engines at the No. 1 Plant is among the earliest "Caterpillar" Diesels ever built—a D9900 that has been on the job for 15 years! Too old to have an hour meter, it operates 9 hours a day, 6 days a week, the year 'round, and never gives any trouble. At a conservative estimate, this old-timer has done between 30,000 and 40,000 hours of hard work, and it's still going strong.

• The two "Caterpillar" Diesel D13000 Engines at the other plant are not as venerable but they're doing all right, too. Says Foreman W. H. Higginbotham: "They just sit there and hammer away with no effort at all. We hardly know we've got 'em. We certainly are more than satisfied."

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

DIESEL ENGINES • TRACTORS MOTOR GRADERS EARTHMOVING EQUIPMENT

PIT AND QUARRY

MAY 1948

Vol. 40 No. 11

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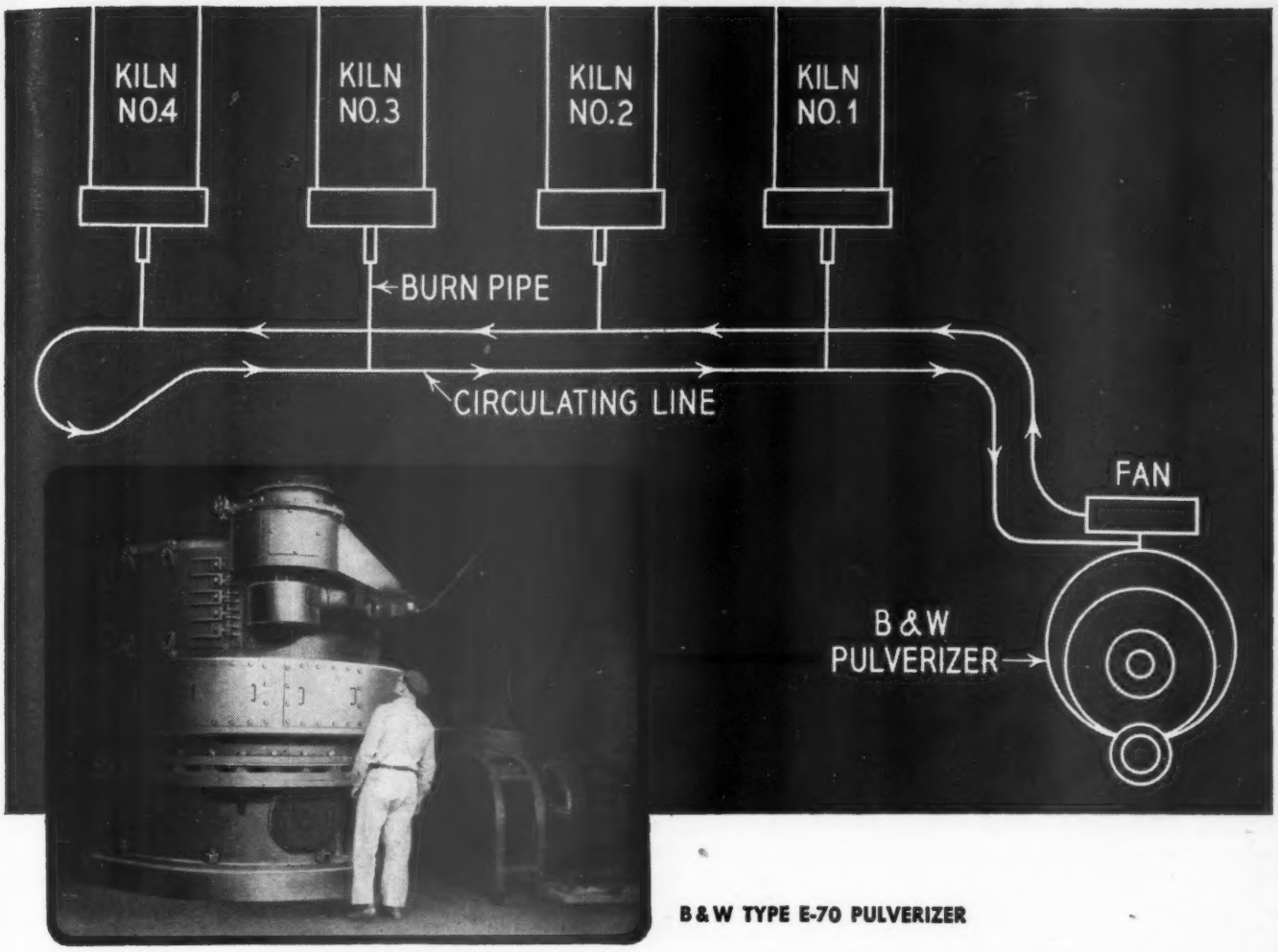
PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

To subscribers: Data on lower right-hand corner of envelope indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.



B & W TYPE E-70 PULVERIZER

FIRST APPLICATION

of pulverized-coal *Circulating System* in cement industry

Four cement kilns in a Mid-western plant are connected to a large B&W Type E Pulverizer, as shown in the schematic diagram. Complete operating flexibility is obtained, since by valve control the kilns can be fired in any combination. Kiln temperatures are controlled simply by operating a valve, with the same ease as when kilns are individually fired. Adequate fuel supply and distribution are assured at all times by automatic control of fuel-to-air ratio through the pulverizer. This development represents another example of pioneering by B&W.

C-80

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editorial

Our Highways

THE growing volume of information which has become available recently on the deplorable condition of our highways makes clearly evident what we have suspected for a long time, that our present highway programs and appropriations are ridiculously inadequate even to maintain our highways in their present poor condition. This is only too apparent to one who has made long automobile trips lately, and to us it is a certainty, as members of our editorial, circulation and advertising staffs have in the past year traveled the main highways and back roads of every state in the Union. Everywhere frantic efforts are being made to stem the inevitable deterioration of all types of roads due to old age, frost upheavals, surface disintegration, etc. Almost without exception the battle is a futile one.

An example of the need for more highway work, perhaps somewhat exaggerated, is contained in a recent report of the Kentucky Citizens' Committee for Long-Range Planning which says that it would cost more than $500,000,000 to bring Kentucky's roads up to standard. This in spite of the fact that Kentucky's roads in recent years have compared favorably with those of almost any other state. According to this report 6,372 miles of the 14,393 miles of federal-aid roads in the state are sub-standard and it would cost $366,053,000 to improve them. An additional $167,616,063 would be required to bring up to standard the 25,845 miles of rural or third-class roads outside the federal-aid system.

These figures are far in excess of the present appropriations in that state for highway work. Kentucky is now spending $18,000,000 a year on state roads, at which rate, according to the committee, it would take 20 years to bring them up to standard. By doubling this annual outlay, the report said, state roads could be brought up to standard in 10 years. These figures do not include rural roads, only part of which are maintained by the state, and which at the present rate of expenditure would take 27 years to be brought up to standard. More than $45,000,000 must be spent on rural bridges alone, according to the committee. Projected on a nation-wide scale the above figures are typical of our highway needs throughout the country and the inadequacy of the funds being appropriated for them.

The years 1922-30 represented the first big highway-building era in this country, when many states for the first time came out of the mud. A large percentage of the new highways built during these years were of so-called "permanent" concrete construction. Engineers actually estimated the life of these roads, under then-existing conditions, at from 20 to 30 years, which means that most of them would normally now be ready for replacement. During the ensuing years, however, the volume of traffic has multiplied many times and speeds and wheel loads have been stepped up, especially with respect to trucks and busses, resulting in much more rapid deterioration than was originally anticipated.

The early concrete highways were designed mainly for automobile traffic and proved to be entirely inadequate for later needs. Their slabs were too thin and too narrow, and were poorly designed and inadequately reinforced. Little was known then, too, about sub-soil stabilization, road-base construction, drainage, and the many other phases of modern highway construction. The quality of cement and aggregates used in those days was also below present standards, the sciences of concrete mix and structural design were in their infancy, and supervision of the actual construction was often lax.

Types of pavements other than concrete have also failed to stand up under present traffic conditions for much the same reasons.

It has now become clearly evident that the only answer is to abandon old concepts and to start at once on a unified nation-wide highway construction program which will provide high-speed, soundly-designed and built arteries between all major points and adequate weather-proof secondary and rural roads. Present restrictions on truck speeds and loadings should be rigidly enforced, as should also regulations keeping heavy trucks off pavements and bridges inadequate to carry them. Another step forward which has been receiving some attention of late would be to raise the present low salaries of state and federal highway personnel to levels which would attract the caliber of men necessary to design, build and maintain a modern highway system.

Strike Loss To Workers

MUCH has been said about the economic loss to industry and the nation caused by strikes, and we have all felt the results of the past coal, rail, automobile and other strikes. The wage loss to the striker has also been emphasized many times but seldom, in our opinion, as clearly, simply and forcibly as in a recent release of the Labor Relations Institute. One of the best ways to persuade workers to remain on the job during the negotiation of a new contract, it is stated, is for the employer to emphasize how much a stoppage will cost the workers in terms of wages lost. For example, if the difference between the amount of increase demanded by the union and the amount offered by the company is only one cent per hour an employee who earns 75 cents an hour must work 75 hours for every hour on strike, in order to make up for lost time.

A table published by the Institute shows how long employees must work in order to make up lost time, depending on the amount of increase granted. For instance, a strike that lasts five days and results in a 5 percent increase will take the worker 20 weeks to make up, while a four-week strike, followed by a 7½ percent rise in pay, will take 60 weeks—two months beyond the life of a one-year contract.

Walter E. Trautfer

news of the industry

PIT AND QUARRY

Latest ICC Increase in Freight Rates to Cost Public $300,000,000 Yearly

The Interstate Commerce Commission granted the nation's railroads a further temporary freight rate increase on April 19. The new schedule is estimated to cost the public about $300,000,000 annually. Commission officials figured the raise would average about 4 percent above present rates.

Last October the ICC, acting on the railroads' plan for a 30 percent advance in freight rates, authorized a temporary 10 percent increase to meet higher operating costs. Another 10 percent temporary increase was granted in January. The latest announced raise will be effective until the commission passes finally upon the plea for permanent upward adjustments. The new increase may be applied upon 10 days' notice to the public.

Coal Miners' Walkout Closes Missouri Portland Cement

Because of the current coal shortage, resulting from the miners' walkout, the Missouri Portland Cement Company on April 4 suspended manufacturing operations at its plant in St. Louis.

The shutdown threw 300 employees temporarily out of work, according to company officials. It was indicated that production would be resumed as soon as a supply of coal became available. The plant consumes about 12 carloads of coal each day.

Union Pacific Uses Services Of Distinguished Copy Writers

Union Pacific's long-range industrial advertising program features in 1948 a series of 12 magazine ads prepared by what is probably the most distinguished staff of copy writers who ever sharpened pencils. This series is currently appearing in PIT AND QUARRY.

Officials at the railroad's Omaha headquarters announced that copy for the ads was written by the following governors of 11 Western states:

C. A. Robins of Idaho, Herbert B. Maw of Utah, Earl Warren of California, Val Peterson of Nebraska, Mon C. Wallgren of Washington, Vail Pittman of Nevada, Lee Knous of Colorado, Lester Hunt of Wyoming, Sam C. Ford of Montana, John H. Hall of Oregon and Frank Carlson of Kansas.

The twelfth copy writer is G. F. Ashby, president of Union Pacific, who wrote the first ad, which appeared in March.

Coming Events

May 12-14, 1948—Hot Springs. Annual meeting, National Industrial Sand Association, The Homestead.

June 4, 1948—Chicago. Directors' meeting, Agricultural Limestone Division, National Crushed Stone Association, Edgewater Beach Hotel.

June 21-25, 1948—Detroit. Annual meeting, American Society for Testing Materials.

July 8, 1948—Hot Springs. Directors' meeting, National Crushed Stone Association, The Homestead.

July 16, 1948—Chicago. Directors' Meeting, National Agricultural Limestone Assn., Inc., Hotel Bismarck.

July 16-24, 1948—Chicago. Annual convention and road show, American Road Builders' Association, Soldier Field.

July 21-23, 1948—Seattle. Summer convention, American Society of Civil Engineers, Olympic Hotel.

September 20, 1948—Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor.

September 22, 1948—Colorado Springs. Directors' meeting, National Sand and Gravel Association, The Broadmoor.

October 18-22, 1948—Chicago. Thirty-sixth National Safety Congress and Exposition, Stevens Hotel.

October 20-22, 1948—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association, The Greenbrier.

Portland, Ore., Welcomes First Nonmetallic Meeting For Northwest States

The first annual meeting of the Northwest Industrial Non-Metallic Minerals Conference will be held at the Multnomah Hotel in Portland, Ore., on May 8. Increased industrial activity in the Northwest and accompanying increase in the consumption of industrial nonmetallic minerals led the members of the Oregon section of the American Institute of Mining and Metallurgical Engineers to believe that a regional conference devoted to this field would be beneficial. Washington and Idaho engineers approved the plan, and as a result it was decided to hold such a conference annually, rotating among the cities of Portland, Seattle and Spokane.

Sponsoring the first meeting, in addition to the A.I.M.E., will be the Oregon State Department of Geology and Mineral Industries, the Portland Chamber of Commerce and the Raw Materials Survey.

Longview-Saginaw Lime Works Headed by Mrs. G. A. Brewer

The following officers were recently elected for the current year to head the Longview-Saginaw Lime Works, Inc., a 70-year-old Birmingham, Ala., concern: Mrs. George A. Brewer, chairman; Warren Lewis, president; Malone Moore, vice-president and treasurer; Irwin Ehlmann, secretary; E. M. Snow, manager.

The board of directors includes the following: Mrs. Virginia A. Brewer (chairman), Mrs. Murray A. Meade, Warren Lewis, Mrs. Chloe L. Adams, Mrs. Chloe G. Ehlmann, Bert M. Meadow and Borden Burr (counsel).

Sproule Brothers to Move Equipment to New Plant Site

A limestone and gravel crushing plant formerly owned by H. P. Seeley near Elizabeth, Ill., is now owned and operated by Cyrus R. Sproule Jr. and Kenneth B. Sproule.

The new proprietors, who have operated a gravel business at a smaller plant in Menominee County under the name of Sproule Brothers, will move their equipment to the new site.

Dollar Volume for First Quarter Building Contracts Sets New High Record

F. W. Dodge Corporation reported that a new first-quarter high mark in dollar volume of construction contracts has been set in the 37 states east of the Rocky Mountains with a total of $1,-986,936,000. This volume surpasses by 23 percent the previous first-quarter record established last year.

While the dollar volume of residential contracts was maintained at a level equal to the first quarter of last year, nonresidential contracts were up 42 percent and heavy engineering awards increased 46 percent over the comparable period of 1947.

Thomas S. Holden, president of the fact-finding agency for the construction industry, pointed out that the sharp increase in construction costs during the last year accounted for some, if not all, of the dollar volume gain.

The physical volume of nonresidential space as measured by square foot floor area and covered under contracts awarded in the first quarter was substantially in excess of that reported for the corresponding period of last year, Mr. Holden said. At the same time, considerably less new floor area is reported for residential buildings.

Gains in dollar volume of construction contracts were shown for eleven of the corporation's fifteen reporting regions. Those areas whose gains were equal to or greater than the average for the 37 states are: upstate New York; the Middle Atlantic states; the Southeastern states; southern Michigan; northern Illinois; Indiana, Iowa and Wisconsin; eastern Missouri, southern Illinois, western Tennessee and Arkansas; Louisiana and Mississippi; Minnesota, North Dakota, South Dakota; western Missouri, Kansas, Nebraska and Oklahoma. Other regions showed a gain over the first quarter of last year except New England, down 7 percent; metropolitan New York and northern New Jersey, off 2 percent; southwestern Ohio and Kentucky, down 19 percent; and Texas, off 4 percent.

Wallace E. Wing New Chairman Of N.L.A. Operating Division

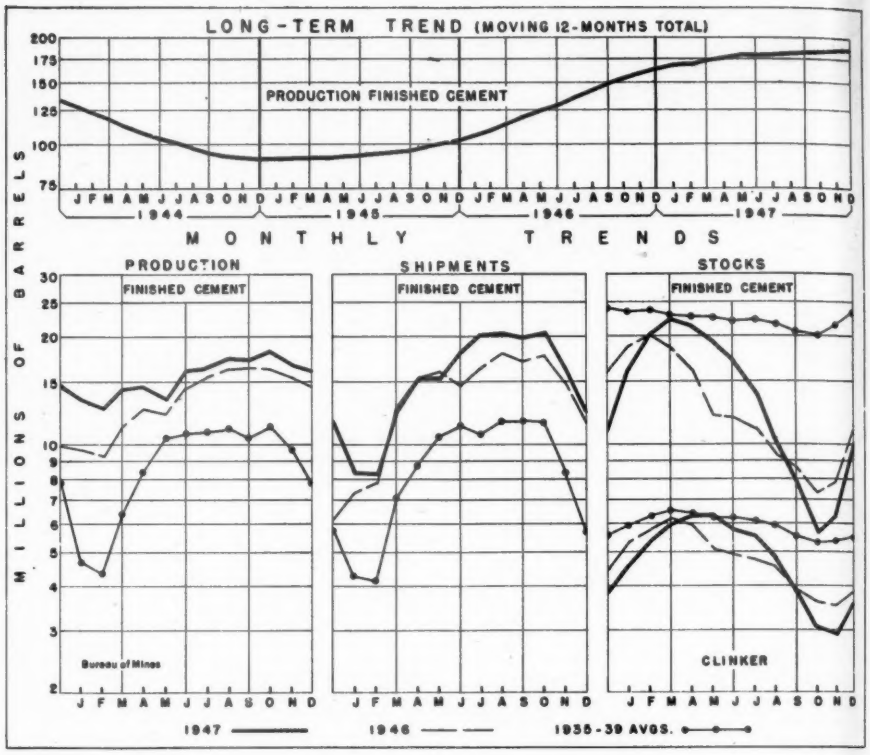
Wallace E. Wing, president of the Marblehead Lime Company, Chicago, has been named chairman of the National Lime Association's Operating Division. He succeeds Bolton L. Corson, vice-president of G. & W. H. Corson, Inc., Plymouth Meeting, Pa., who resigned after directing two successful meetings—the first held in connection with the convention in Hot Springs, Va., and the second in January in Cincinnati, Ohio.

The next meeting of the Operating Division is tentatively scheduled for late October or early November, 1948, in the Middle West.

Canadian Sand-Gravel Output Tops 39,000,000 Tons in 1946

According to statistics released by the Canadian government, the Dominion in 1946 produced a total of 39,949,994 tons of sand and gravel, valued at $15,-529,700, as compared with the previous year's output of 29,750,703 tons, valued at $10,568,363. There was an increase of 34.3 percent in tonnage and 46.9 percent in value. Totals included sanded sand and gravel used in railroads as ballast, gravel used by mines as backfill and recoveries of sand by dredges, as well as similar materials from other sources. Leading producers were located in Ontario and Quebec.

Imports of sand and gravel amounted to 70,664 tons, valued at $71,101 during 1946, and exports totalled 352,819 tons valued at $234,182.



Production of 16,124,000 barrels of cement in December, 1947, as reported to the U. S. Bureau of Mines, was 11 percent above that reported for December, 1946. Seventy-nine percent of capacity was utilized, an increase of 8 percent over that reported for the corresponding month of the previous year. Mill shipments reached 12,380,000 barrels in December, 1947, an increase of 8 percent over those reported in December, 1946. Stocks of 9,953,000 barrels on December 31, 1947, were 9 percent below those reported for December, 1946. Clinker production in December, 1947, reached 17,024,000 barrels, an increase of 13 percent over the output reported for December, 1946.

Demand for cement in December, 1947, as indicated by mill shipments, continued good and although they follow the usual seasonal trend the quantity consumed was considerably above that reported for the 1935-39 average.

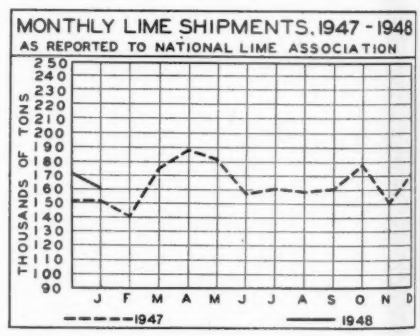
Production of portland cement in 1947 reached 186,534,000 barrels, an increase of 14 percent above the previous year's total and a new all-time high for the industry. Shipments reached 187,396,000 barrels, an increase of 11 percent over the 1946 figure.

Indiana Limestone's '47 Gross Sales Reach $3,000,000

The Indiana Limestone Co., Inc., sold nearly 3 million dollars worth of stone last year and showed a net profit after all expenses of more than $120,852.52. This was the largest profit shown by the company since 1928.

In addition, the company retired $64,-300 in general mortgage bonds and met interest obligations outstanding to the tune of $92,928.34.

At a recent meeting of stockholders all officers of the company were re-elected. The president of the company is William G. Ripley.



According to data collected by the National Lime Association, 44 companies in January, 1948, shipped 162,422 tons of lime (104,967 quicklime; 57,455 hydrate). Reporting companies represent 48.6 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 368,000 tons. Shipments by uses and grades for January, 1948, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	434	5,274
Building	9,095	28,467
Chemical	95,438	23,714
Totals	104,967	57,455

General Portland's Output Increased as Result of $2,385,000 Expansion

Since February, 1947, the General Portland Cement Company, formed at that time from the consolidation of the Florida Portland Cement Company, the Signal Mountain Portland Cement Company and the Trinity Portland Cement Company, has spent approximately $2,385,000 on an improvement and expansion program.

The installation of a large new kiln at the Fort Worth plant was completed in September, 1947. This kiln is 426 feet long and 12 feet in diameter. A similar kiln was installed at Tampa and was placed in operation on January 17, 1948.

As a result of this program the company's annual productive capacity has been increased by approximately 1,250,000 barrels of cement. Additional improvements estimated at $1,900,000 for the year 1948 are expected to provide further productive capacity, as well as greater efficiency and flexibility of operations. These expenditures will be financed from company funds on hand and profits derived from the current year's operations.

Canadian Cement Production Hits All-Time High in 1947

The Canadian Ministry of Trade and Commerce reported an all-time high in the nation's cement production for 1947, with shipments the second highest in the history of the industry. During the year a total of 11,936,245 barrels, valued at $21,968,909, were sold or used by producers, an increase of 3.2 percent in value over 1946 shipments. Shipments by provinces were as follows: Quebec, 5,453,407 barrels; Ontario, 3,529,438 barrels; Manitoba, 1,352,109 barrels; Alberta, 737,551 barrels; British Columbia, 863,740 barrels.

Eight plants, having a total of 19 kilns, were reported to have a combined rated capacity of 38,000 barrels per day. They are as follows: the Canada Cement Company's plants at Hull and Montreal East (Quebec); Port Colborne and Belleville (Ontario); Fort Whyte (Manitoba); Exshaw (Alberta); St. Mary's Cement Co., Ltd., St. Mary's (Ontario); British Columbia Cement Co., Ltd., Bamberton (British Columbia). The gross value of shipments, f.o.b. works was $23,582,011.

Imports of portland cement into Canada amounted to 1,248,625 barrels (valued at $3,843,652) in 1947, an increase of 256 percent over the quantity for 1946. The apparent consumption of cement in Canada for the year was 13,096,840 barrels.

Rising & Nelson Slate Co. Sold to New Corporation

The Rising & Nelson Slate Company of West Pawlet, Vt., a co-partnership owned by Simeon M. Rising IV, Arthur H. Morrow and the estate of Eugene J. Lyng, has been sold to Willis F. Bronkie of Ansonia, Conn., Forbes K. Wilson of York, Me., and James M. Mertz of Purchase, N. Y., who have incorporated under the same name.

Reportedly the oldest and largest roofing slate interest in Vermont, the company quarries and ships to all parts of the United States. Quarries are located in West Pawlet, South Poultney, and North Poultney.

The March Cover Picture

Due to a regrettable error in identification, we captioned the cover photograph of our March issue "A view in the pit of the Waukesha Sand and Gravel Company, Waukesha, Wis." Actually, as we were notified by the Jaeger Sand & Gravel Company, Inc., West Allis, Wis., this was a scene in the *Jaeger* gravel pit, located two miles southeast of Waukesha. Right location; wrong company. Sorry!

Chuckle Chaps Turn Serious To Sell Industrial Safety

Popeye, the Katzenjammer Kids and The Little King are working on the accident prevention problem. These famous comic strip characters and several others will step out of the funny papers and into a new series of safety posters just announced by the National Safety Council. The comic favorites are expected to have an equally strong influence in their roles as safety salesmen.

The well-known comic strip artists who have contributed their talent as a public service to the Council include Carl Anderson, author of "Henry"; Walt Disney, author of "Mickey Mouse"; H. H. Knerr, author of "The Katzenjammer Kids"; George McManus, author of "Bringing Up Father"; Tom Sims and Bill Zaboly, authors of "Popeye"; O. Soglow, author of "The Little King"; and Chic Young, author of "Blondie".

The comic series is featured in a new free catalogue of safety posters, showing miniatures in full color and black and white, now available without charge from the National Safety Council, 20 North Wacker Drive, Chicago 6, Ill.

POPEYE by TOM SIMS & BILL ZABOLY
OH, ME POOR ACHIN' BACK!
HOW TO LIFT
BEND YOUR LEGS— NOT YOUR BACK-
SPINACH ALONE AIN'T ENOUGH, POPEYE, YOU GOTTA BEND YOUR LEGS!
THE COMIC WEEKLY

• Popeye gets a lesson in industrial safety.

Riverside's Oro Grande Plant Doubles Output—Yearly Goal 3,500,000 Bbl.

Garner A. Beckett, president of the Riverside Cement Company, announced to stockholders at the annual meeting held on April 8, 1948, that the capacity of the company's Oro Grande plant has been doubled since 1947 from 1,200,000 to 2,400,000 barrels of finished cement annually. Additional equipment now being delivered at this plant will be installed within six months. At that time, the capacity of the Oro Grande plant will increase to 3,500,000 barrels per year. In one year, the company's output will jump 2,300,000 barrels in annual production. Mr. Beckett further stated that this extra production is an overall 25 percent increase in southern California.

At the meeting, the company's directors were re-elected and the board of directors voted for the quarter ending April 30, a dividend of $1.25 per share on the preferred stock payable May 1, to stockholders of record April 15, 1948.

California Concern Sinks Unique Shaft in Quarry

In connection with the enlargement of its limestone quarry, the Santa Cruz Portland Cement Co. is using an unusual method for sinking a shaft.

The shaft is being sunk by a core drilling similar to that used in drilling oil wells. An oil well derrick and surface equipment are used to drive a large cylindrical cutting bit and core barrel. Fine hard steel shot is fed to the lower edge of the steel bit, which is rotated rapidly, grinding the three-foot annular slot into the rock.

The job is progressing at an average rate of five feet a shift, with a possible drilling rate of from 10 to 15 ft. a shift. This is several times as fast as standard shaft-sinking methods.

Bedford-Nugent Facilities Damaged by $2,000 Blaze

Fire caused an estimated damage of $2,000 at the motor and power house of Bedford-Nugent Sand & Gravel Company at Evansville, Ind., on Jan. 15. James L. Nugent Jr., assistant superintendent, praised the local fire department for preventing much greater damage.

A motor which was badly damaged was used to power yard cars during the unloading operations. The barges owned by the company were in Green River winter quarters.

Much comment was heard on the upper Ohio River in January regarding the efficient winter towing of the sternwheel motor vessel *Keystone*, operated by the Ohio River Sand & Gravel Corporation, New Martinsville, West. Va. This boat, approximately 10 years old, sank a few years ago but was raised and has given continuous service.

3 National Associations Announce New Address for Washington Headquarters

The National Sand and Gravel Association, the National Ready Mixed Concrete Association and the National Industrial Sand Association announce the removal of their joint headquarters from the Munsey Building to 1325 "E" Street, N.W., Washington 4, D. C.

The offices are now located in the National Theatre Building, immediately adjacent to the Munsey Building. All of the seventh floor will be occupied by the three associations.

Penn-Dixie to Spend $500,000 For Expansion at Richard City

The Pennsylvania-Dixie Cement Corp. plans to carry out a $500,000 improvement program at its Richard City, Tenn., plant, according to B. W. Druckenmiller, company president.

The program will consist principally of the installation of new machinery and equipment at the finishing mill. Very little new construction work will be done. It is hoped that a major part of the work will be completed during 1948.

Equipment Important in 1948 U. S. Highway Program

Due to the accumulated deficit of the past few years, some $650,000,000 worth of road building and maintenance equipment will be needed for the 1948 highway program, according to Charles M. Upham, engineer-director of the American Road Builders' Association.

Improvements in equipment are keeping pace with the postwar highway program, Mr. Upham stated in a talk at Washington, D. C. The American Road Builders' Association's first postwar Road Show to be held at Soldier Field, Chicago, July 16-24, will demonstrate striking advances in efficiency of the new road building equipment designed for the greatest highway construction program in history.

In discussing the importance of equipment in the highway program, the A.R.B.A. official estimated that approximately $240,000,000 worth of equipment will be required by state, county, and municipal governments for highway maintenance this year.

The $1.5 billion 1948 construction program will call for another $265,000,000 worth of equipment. Mr. Upham stated that an additional $150,000,000 must be invested in new equipment to bring construction equipment inventories up to normal.

"From 1922 up to World War II, continuous improvements in road building machinery were made to meet demands of constantly improving highway design," Mr. Upham said. "Had it not been for this continuous improvement, road building costs would now be prohibitive."

During World War II, machinery was necessarily standardized and few changes were made, he added. Since its end, American manufacturers have made rapid progress in developing new equipment designed to operate more economically and efficiently.

In the huge 30-acre display area at Soldier Field thousands of pieces of equipment will be exhibited by more than 300 manufacturing concerns, with many new developments on view for the first time, Mr. Upham pointed out. Machinery and materials used in building and maintaining highways and airports all over the world will demonstrate recent advances in utility and service.

Demonstrations, films showing roads in use and under construction, and displays showing development of road building machinery will be featured.

The 45th annual A.R.B.A. convention will be held concurrently with the road show. Road builders from all over the world will hear international authorities discuss all phases of street, highway, and airport construction.

Feiss Appointed Assistant To Boyd in U.S. Mines Bureau

Julian W. Feiss, editor of *The American Mining Congress Journal,* has been appointed mineral consultant and assistant to the director of the U. S. Bureau of Mines, James Boyd.

Before becoming editor of the *Mining Congress Journal* Mr. Feiss served as mining engineer and consultant for several large American and foreign firms. He received his technical training at Princeton University and the Arizona School of Mines.

Early in his professional life Mr. Feiss went to Northern Rhodesia, Africa, as a field geologist and mining engineer for the Rhodesian Congo Border Concessions, Ltd. He later became affiliated with Crowell & Murray, Inc., Cleveland, and subsequently with the Climax Molybdenum Company, Climax, Colo. From 1942 to 1946 he served in the Army military intelligence service, attaining the rank of major.

Julian W. Feiss

Aggregates Producers Meet with R. M. C. Group at San Francisco Joint Session

About 75 northern and central California aggregates and ready mixed concrete products gathered at the Sir Francis Drake Hotel, San Francisco, on March 18 for a joint luncheon and the annual meetings of the Rock, Sand & Gravel Producers' Assn. of Northern California, and its affiliate, the Northern California Ready Mixed Concrete & Materials Assn.

E. F. Brovelli (Basalt Rock Co., Napa) was named president of the aggregates group, succeeding Carl R. Olson (Henry J. Kaiser Co., Oakland). R. K. Humphries (Pacific Coast Aggregates, Inc., San Francisco) was chosen as the new vice-president.

The ready-mix organization re-elected H. Irving Rhine (Bode Gravel Co., San Francisco) as its president and R. L. Stevens (South City Lumber & Supply Co., South San Francisco) as vice-president.

E. R. Booker continues as executive secretary-treasurer of both organizations, joint offices being maintained at 564 Market St., San Francisco.

Chairman of the joint luncheon meeting was John E. Porter (Granite Rock Co.-Central Supply Co., Watsonville). Guest speakers included John Reber, author of the so-called "Reber Plan" which would convert the upper and lower portions of San Francisco Bay into freshwater lakes as a water-conservation measure; and Brig. Gen. P. G. Bruton. Both Mr. Reber and Gen. Bruton explained and endorsed the Reber proposal. A. P. Stryker, Pacific Gas & Electric Co., outlined and explained the strict emergency regulations of the California Public Utilities Commission covering the conservation of power throughout central and northern California during the ensuing year. The restrictions, initiated because of the severe prolonged drought on the West Coast, have reduced available power to all industries and have already forced most of the producers present at the meeting to limit their hours of production or to install equipment for plant generation of power.

Ideal Cement Co. to Expand Trident Plant's Capacity

Expansion plans have been announced by officials of the Ideal Cement Company, Denver Colo., for the firm's plant at Trident, Mont. Although these facilities have been adequate for the local commercial needs, the vast program to be undertaken by the Bureau of Reclamation in this area makes an expanded capacity imperative.

Ideal's Trident plant will furnish huge quantities of cement for the bureau's Hungry Horse, Yellow Tail and Canyon Ferry projects, which are all located within the state of Montana. Additional burning and grinding equipment will be added this year, and plans are being formulated for the construction of a new plant beside the existing facilities. It is anticipated that the output at Trident will be ultimately doubled.

International Minerals Announces Early Opening of New Noralyn Facilities

Progress on the new Noralyn phosphate mine and plant, under construction near Bartow, Fla., by International Minerals & Chemical Corporation, now indicates that it will be ready for operation in the immediate future, according to Franklin Farley, vice-president of the corporation's phosphate division, who recently made an inspection of the huge project.

Output of the new mine is expected to attain a production capacity of 1,500,000 tons of phosphate annually, making it the largest mine of its kind in the Western Hemisphere, Mr. Farley pointed out. With an annual present production capacity of 2,000,000 tons from its Peace Valley and Achan mines, also near Bartow, completion of the new project will give International Minerals & Chemical Corporation a total annual phosphate production capacity of 3,500,000 tons from its Florida fields. This capacity alone will exceed the annual prewar phosphate output of all companies operating in Florida.

The new Noralyn mine will utilize all the latest advances in the science of phosphate mining and refining, many of which were developed by the corporation's research division. Production of phosphate at the Noralyn mine will be accomplished by the familiar strip mining technique used throughout the Florida phosphate fields, utilizing giant dragline excavators to remove the surface soil and tap the extensive sub-surface ore beds that represent the richest deposits of that mineral in this country. The Noralyn mine constitutes one of the richest phosphate beds thus far discovered, and it is predicted that it will be in production for at least 25 years before exhaustion.

Although the new mine will be in actual operation in about one month, its output will be transported initially for drying and shipping from other nearby company facilities now in operation until construction of its own drier is completed later this year. As soon as the additional drier equipment is ready, International Minerals & Chemical Corporation will have a total phosphate production capacity three times its prewar output rate.

The heavy investments by the corporation in its Florida phosphate operations were made in recognition of the growing demands for the phosphate component in fertilizers and industrial chemicals, both by domestic agriculture and industry, as well as the needs of foreign markets in the devastated European and Western Pacific areas.

• The new Noralyn plant during construction.

More than 200 Attend Iowa Agstone Group's Meeting

The Iowa Agricultural Limestone Association held its third annual meeting at the Kirkwood Hotel, Des Moines, on February 26. More than 200 enthusiastic producers and guests attended the one-day convention.

As in past years, this well-managed state organization provided an opportunity for members to discuss common problems confronting the agstone producers at a lavish buffet feast arranged for their entertainment. Among the guests were Governor Blue, Harry D. Linn, Iowa's Secretary of Agriculture, and Wayne Darrow of the Farm Letter, Inc., Washington, D. C.

Mr. Darrow, the featured speaker, gave the group some interesting facts on the attitude of Congress toward the limestone program. He was very optimistic over the likelihood of increased appropriations for conservation next year. At the end of his fine talk he answered questions from the floor clarifying certain aspects of the present and future agricultural program.

The board of directors decided to increase their number from nine to eleven. Therefore, the nominating committee, headed by Paul M. Nauman, selected five new directors: three to fill vacancies occurring on the board, and two others.

The following were nominated and elected to the board: K. K. Kinsey, Concrete Materials & Construction Co., Cedar Rapids; William D. Dillon, Dillon-Sharpe & Co., Columbus Junction; Ray Cook, Ray Cook Construction Co., Ames; C. M. Kirtley, Missouri Valley Limestone Co., Macedonia; and Roy A. Potthoff, Sargent Bros., Des Moines. Clint A. Allen remains executive secretary.

The steamer *R. J. Nugent,* formerly the U. S. Engineer boat *Scioto,* is now at work for the owners, the Nugent Sand Co., Louisville, Ky. The craft was recently given its annual inspection by Coast Guard officials.

$1,500,000 Clarence Center Expansion of Natl. Gypsum Reported Nearly Complete

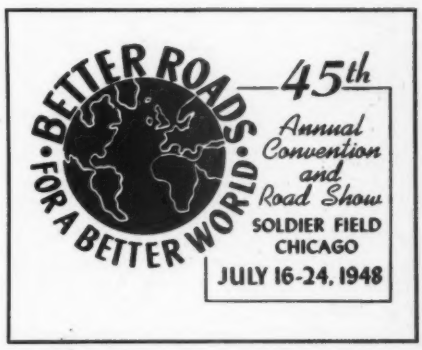
An expansion program costing more than $1,500,000 at the National Gypsum Company's plant in Clarence Center, N. Y., is nearing completion.

Equipped with modern machinery, the new plant will contain about 32,000 square feet of space. It will replace older units containing about 38,000 square feet of space, which will be used for warehousing.

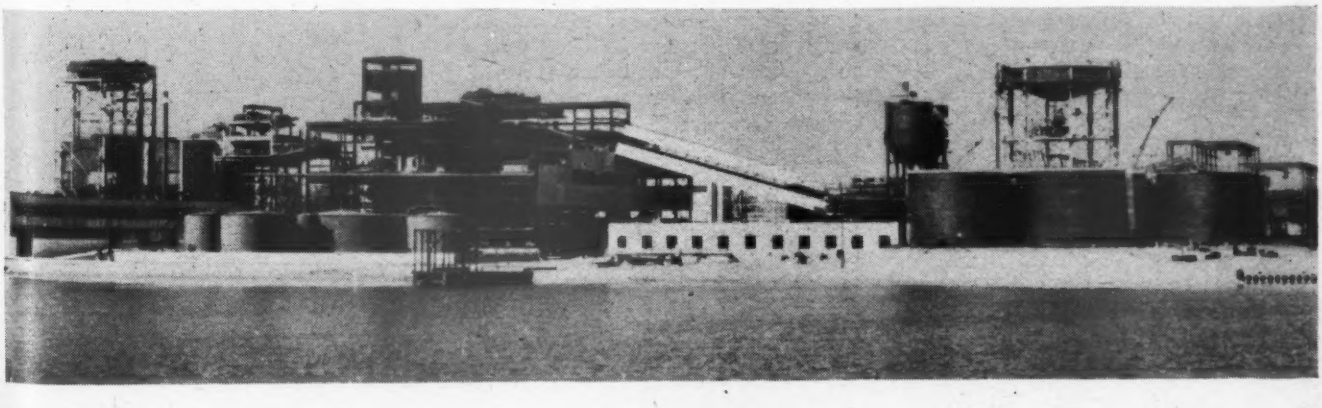
When completed, the Clarence Center plant will be one of the most modern and efficient in the industry. With production about 70 percent above 1946 levels, the plant will turn out about 17,000,000 square feet of such gypsum products as wallboard lath and sheathing—plus about 6,000 tons of plaster monthly.

Many of the manufacturing innovations are developments of the company's engineering division. New crushers for gypsum rock, new calciners, drying ovens, an extensive conveyor system and automatic controls have been installed, and a new power plant has been erected. At the mine new equipment has also been added.

Most of the machines and equipment in National Gypsum's plants are represented by miniature working models in the 2-story Clarence Center laboratory. These models are used for exploratory work in developing new and improved manufacturing methods.



• Wide circulation will be given the American Road Builders' Association's slogan for their 45th annual convention and road show, for the accompanying cut (in miniature) will appear on every piece of mail sent out by PIT and QUARRY between now and the time of the convention, July 16. We also plan to give publicity to other events related to the nonmetallic minerals industries.



Venard Named President Of Vermiculite Institute At San Antonio Meeting

The annual meeting of Vermiculite Institute, held at the Plaza Hotel, San Antonio, Tex., March 22 through 25, was attended by vermiculite processors from all sections of the United States and Canada. Practically every distributor in the industry was represented. Shelton W. Greer, Vermiculite Products Corp., Houston, and R. H. Rice, Mineral Products, San Antonio, acted as co-hosts.

At the business session, which opened the meeting, the following officers were elected: president, L. J. Venard, Western Mineral Products Co., Minneapolis; treasurer, W. J. Bein, Zonolite Co., Chicago; executive secretary, E. R. Murphy, Vermiculite Institute headquarters, Evanston, Ill.

Two new and important committees were appointed: a planning committee of five members, with G. R. Stark, B. F. Nelson Mfg, Co., Minneapolis, acting as chairman; and a standardization committee, of which C. A. Pratt, Western Mineral Products Co., is chairman.

The Tuesday and Wednesday sessions were devoted to technical papers and discussions. Guest speaker was T. R. Higgins, director of engineering, American Institute of Steel Construction, New York City, who spoke on fireproofing structural steel columns with vermiculite plaster.

"For the past two years," Mr. Higgins said, "The American Institute of Steel Construction has been carrying on a series of fire tests on structural steel columns fireproofed with various lath and plaster constructions. We have been prompted to do this for several reasons. In the first place, there have been almost no fire tests run on protections for steel columns for the last 25 or 30 years. In that time, many improvements have been offered, both in materials and construction methods; but these newer developments have been under a handicap in many cases because of antiquated building codes.

"Moreover, in the typical light occupancy type of building, the loss of space occasioned by larger-than-necessary columns and thicker - than - necessary partitions can become a serious objection, particularly in hotel and apartment house construction where the total floor area is considerably sub-divided into relatively small rooms. This has given impetus to the use of 2-in. solid plaster partitions, with which a plaster enclosure of the supporting columns ties in very nicely. Too, the elimination of masonry furring not only reduces the space consumed by columns, but cost studies indicate should effect an over-all saving, as well.

"It all seemed to add up to a logical choice of lath and plaster fireproofing for the columns. Having watched with considerable interest the fire test run on floor constructions using vermiculite plaster ceilings, and having co-operated with personnel of the Vermiculite Institute in some of the tests they ran at the Underwriters' Laboratories, I recommended to our board that we undertake an investigation on our own responsibility with respect to the fireproofing of columns. We have run upward of 30 tests so far. Our conclusions will, of course, be no news to this group here today. Vermiculite plaster can used to obtain a 3- and 4-hour fire rating with constructions which are commercially practical, and which should effect an economy over any of the older types of fireproofing."

Also on Tuesday's program was Harold Strand, B. F. Nelson Mfg. Co., Minneapolis, whose subject was vermiculite acoustical plastic for sound correction.

Wednesday's session was devoted to a discussion of vermiculite insulating concrete. Dayton L. Prouty, Zonolite Co., Detroit, presented a paper on the use of vermiculite insulating concrete sub-slabs for radiant heating and ground floors, as a means of reducing heat losses to the ground.

S. L. Dueger, Zonolite Co., Chicago, discussed vermiculite in brewery construction as a lightweight, permanent material for insulating floors, tanks, and roofs. Other speakers included H. K. Sterrett, Southern Zonolite Co., Atlanta, Ga.; Glenn Sucetti, Universal Insulation Co., Sacramento, Calif.; R. F. Rea, Zonolite Co., Chicago; and C. J. Jefferson, Vermiculite Institute, Evanston, Ill.

On Thursday morning C. K. Duncan, Robinson Insulation Co., Great Falls, Mont., presented data on a study made over a 10-year period of operating costs in 17 locker plants of comparable size, selected at random in Montana. Seven of these plants had been insulated with vermiculite refrigeration fill; the others with other insulation materials. The study disclosed that the average operating cost per year per individual locker insulated with vermiculite was 17c, as compared with an average of 32c for other insulation.

S. K. Robinson, F. Hyde & Co., Montreal, Quebec, reported on results secured with vermiculite insulation fill in reducing seasonal losses in natural ice storage buildings. In one such structure, the seasonal loss of ice was reduced from 600 to 200 tons per year by insulating a portion of the building with vermiculite fill. Robinson pointed out that had the entire building been similarly insulated, the saving would have been even more spectacular.

E. R. Murphy, executive secretary of V. I., announced that the organization is now preparing booklets on vermiculite concrete and plaster, and other folders covering the entire range of vermiculite products. These will be distributed to architects, engineers, building officials, lumber and building materials dealers, and the construction industry generally.

California produces approximately 12 per cent of the gypsum mined in the United States. The bulk is coming from bedded deposits in Riverside and Imperial counties, and as a by-product from Alameda county, according to the state division of mines.

Expansion Projects Started At Plants of Three Venezuelan Cement Firms

Latest reports concerning cement plants in Venezuela indicate that the Maracaibo plant of C. A. Venezolana del Cementos, which has had a daily capacity of 250 tons, is in the process of being enlarged. When improvements have been completed, this plant is expected to produce 500 tons per day, probably by the end of this year. The firm's plant at Pertigallette is not in operation, but will resume production next year.

Facilities of Cia. Nacional de Cementos at La Vega is doubling its capacity and will be producing 500 tons daily by the middle of this year. Expansion of the plant of Cia. Cemento Carabobo at Valencia will boost present output from 100 to 300 tons per day within the next 12 months. Operation of Cemento Falcon at Chichiribichi has been abandoned.

Quick! The Safety Goggles— If You Want to Win a Dollar

Limeographs, official publication of the National Lime Association, reports a successful safety plan used at the Standard Lime and Stone Company's plant at Martinsburg, W. Va. L. J. Mueller, superintendent, and J. C. Clohan, safety engineer, submitted the story.

It seems that the popularity and success of the plan is due to its contest feature. The clock number of each employee is entered on a bit of cardboard, and a drawing is made by the safety engineer once each day. The man whose ticket is drawn is eligible for that day's prize—a dollar bill *if* at the moment he is notified he is found wearing and/or using the prescribed safety equipment for his job. If he is discovered violating such requirements, he loses the dollar.

The contest has been used at Martinsburg about one month of each year for the last several years.

Treatment for Lime Burns Announced by Marblehead

According to the *National Safety Council News Letter,* a new preparation has been developed which successfully treats lime burns. We quote:

"Burns, skin irritations, and the aggravation of bruises and abrasions from lime have been a troublesome problem in the lime industry for years. Summer temperatures, heat from equipment, and clothing saturated with lime dust have increased the difficulties in working with lime.

"Experiments with a new ointment at the South Chicago plant of the Marblehead Lime Company have been very successful, according to a recent letter from Mark E. Snyder, industrial relations and safety director."

Inquiries should be addressed to Mark E. Snyder, Industrial Relations and Safety Director, Marblehead Lime Company, 59 East Madison Street, Chicago, Ill.

Pennsylvania Agstone Producers Name F. E. Wholaver Chairman

THE third annual meeting of the Agricultural Limestone Division of the Pennsylvania Stone Producers Ass'n. was called to order at 9:45 a.m. on March 17, 1948, in the Hotel Penn-Harris, Harrisburg, Pa.

This meeting was opened with an address by Pennsylvania's secretary of agriculture, The Honorable Miles Horst, who stated that the need for the conservation of our soils was more imperative today than ever before. He was pleased to note that the producers of Agricultural Liming Materials were showing such a great interest because lime is basic in keeping soils fertile. Pennsylvania is normally rated as an industrial state with about 92 percent of the population living in towns and cities and only 8 percent living on the farms. Hence, comparatively little attention is given to the agricultural needs of the state. He urged all who were present to give their support toward preserving and maintaining productive soils in Pennsylvania.

Clyde A. Zehner, state chairman of the Pennsylvania Production & Marketing Administration of the U. S. Department of Agriculture, followed Mr. Horst. He emphasized the need for an accelerated conservation program for 1948 and pointed out that whereas in 1946 and 1947 the farmer paid only 40 percent of the cost for his lime, in 1948 he is paying 60 percent. This fact, plus revised soil conservation needs in Pennsylvania caused the state to be granted an additional million dollars, raising the figure from $1,900,000 to $2,900,000. This means an increased number of tons of lime made available to the farmer. Mr. Zehner also pointed out that the state P.&M.A. had set September as the deadline for the completion of the 1948 liming program.

Mr. Zehner led the discussion, with farmer-field men and county chairmen making suggestions for improving delivery service. Included in this discussion were methods of loading cars with bagged material in order to facilitate unloading as well as to cut down the amount of breakage; various types of spread service were also discussed.

Immediately after the luncheon John A. Smith, publicity director of the state P.&M.A., ran the motion pictures on *Phosphorus, the Key to Life* and *This Land of Ours.*

Mr. Smith reproduced transcriptions of radio broadcasts which were designed to educate the public on the values and benefits received from soil conservation programs. These broadcasts are being made at regular intervals over some 30 stations in Pennsylvania.

H. R. Albrecht, head of the department of agronomy of Pennsylvania State College, discussed the state's research program and presented some detailed figures on the progress being made.

He was followed by Roy J. Jordre, assistant to the assistant administrator of the P.&M.A., who explained how the U. S. Department of Agriculture arrived at the soil conservation needs for individual states. He also brought out the fact that increasing the yield per acre was not enough; we must also increase and preserve the number of acres of crop-producing land.

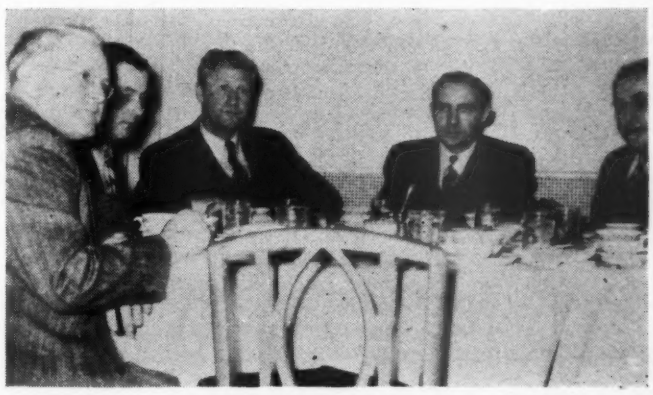
Dr. F. G. Merkle, of Pennsylvania State College, discussed *Lime Use Problems in Pennsylvania Agriculture,* stating that research over the past 10 years had definitely proven the need for both lime and phosphorus in increased amounts on Pennsylvania's soils. Originally the scientists were certain that about 1¼ tons per acre was all that was required to maintain the soil fertility in Pennsylvania. However, today they are convinced that at least 2 tons of liming material per acre.

The open producers meeting was followed immediately by a business meeting, at which the following officers and board of directors were unanimously elected to serve for the year 1948: chairman, F. E. Wholaver, Bellefonte, Pa.; vice-chairman, Leonard S. Fry, Mercersburg, Pa.; treasurer, Ellwood Gilbert, New Castle, Pa.; secretary, H. H. Wagner, Harrisburg, Pa.

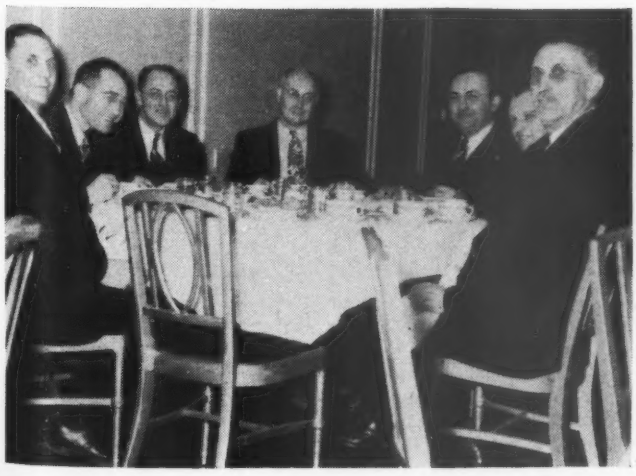
For the board of directors: eastern section, D. K. Shroyer, Annville, and F. Edward George, Thomasville; central section, Robert B. Garman, Tyrone, and C. Roy Binkley, Dry Run; western section, P. E. Heim, Youngstown, O., and H. W. Lamb, Branchton, Pa.

Members made a careful study of an educational advertising program for liming on a statewide basis.

• Right: Dewey Hartman, Annville Stone Co., Hershey, Pa.; Eugene Meckley, Meckley Quarries, Herndon, Pa.; George Hepner, Selinsgrove, Pa.; W. O. Faylor, Faylor Lime & Stone Co., Middleburg, Pa.; H. H. Wagner, secretary, Agricultural Limestone Division, P.S.P.A.



• Below, left: Lloyd R. Olewine, Altoona, Pa.; W. J. Basehore, Crawford County; H. W. Shingledecker, Brookville, Pa.; Alfred L. Riegel, Schuylkill Haven, Pa.; Geo. W. Schuler, Fleetwood, Pa.; Roy J. Jordre, Washington, D. C.; John A. Smith, Harrisburg, Pa.—all representatives of the U. S. Department of Agriculture.



• Below, right: John E. Claar, Sproul Lime & Stone Co., Claysburg, Pa.; Clyde A. Zehner, state chairman, Pa. Production & Marketing Adm.; F. E. Wholaver, Whiterock Quarries, Inc., Bellefonte, Pa.; Shirley T. Aungst, Agricultural Limestone Division, P.S.P.A.; H. W. Lamb, Grove City Limestone Co., Branchton, Pa.; Sam O'Masta, U. S. Dept. of Agriculture, Washington, D. C.

30 years ago in Pit and Quarry

by Walter E. Trauffer

NEWS of the trade associations of the nonmetallic minerals industries in the May, 1918, issue of PIT AND QUARRY again failed to measure up to the outstandingly important developments described in the earlier issues of that year, when the three important national aggregates producers associations were formed. This issue described only the formation of one state association, the Ohio Sand & Gravel Producers Assn. This group held its meeting on April 3, in Columbus, Ohio, with representatives of 30 Ohio producing companies attending. Elected as its first president was F. D. Coppock, president of the Greenville Gravel Co., Greenville, O. Guy C. Baker of the same company was appointed executive secretary. They are now, respectively, president and vice-president of the American Aggregate Corp., Greenville.

Also described in the "Association Activities" department was a meeting of the Indiana Sand & Gravel Producers' Assn., then four years old. Elected as its first full-time executive secretary was E. Guy Sutton, general manager of the Carmichael Gravel Co., Williamsport, Ind. He was at the time secretary of the National Assn. of Sand & Gravel Producers, and some interest was expressed on the possibility of reconciling the two jobs.

On April 9, 1918, the executive committee of the National Crushed Stone Assn. met in Chicago to select a permanent secretary. A. P. Sandles, secretary of the Ohio Macadam Assn., was chosen, and was to perform the secretarial work of both associations.

An indication that PIT AND QUARRY'S editors were even then aware of the potential importance of agricultural limestone as a sales outlet for the crushed stone industry was the feature article "Agricultural Ground Limestone". The author was the late Richard K. Meade of Baltimore, Md., an outstanding chemical and industrial engineer and author. Mr. Meade had no peer as a designer of crushed stone, cement and lime plants and as a consultant on the operating problems of those industries. PIT AND QUARRY was fortunate to have his services as a regular contributing editor. An editorial in the May issue also stressed the agstone market.

In this issue was a detailed description of the crushed stone plant of the Dolese & Shepard Co. at McCook (then Gary), Ill. This outstanding plant, with a capacity then of 600 cu. yd. per hr., was and is a monument to the genius of another great engineer, J. C. Buckbee, now retired and living in California. This plant has really stood the test of time, both as to construction and design. Since it was built in 1909, many mechanical improvements were incorporated as they were developed, including vibrating screens; but no basic changes in the original design have ever been found necessary.

Another outstanding crushed stone plant described in that issue, a few days after it went into operation, was that of the Lehigh Stone Co. near Kankakee, Ill. Its general manager was J. R. Sanborn, who has now been its president for many years, and who has long been an important figure in the state and national associations of the crushed stone industry. The feature of this plant was its flexibility, as it could produce on short notice any combination of sizes.

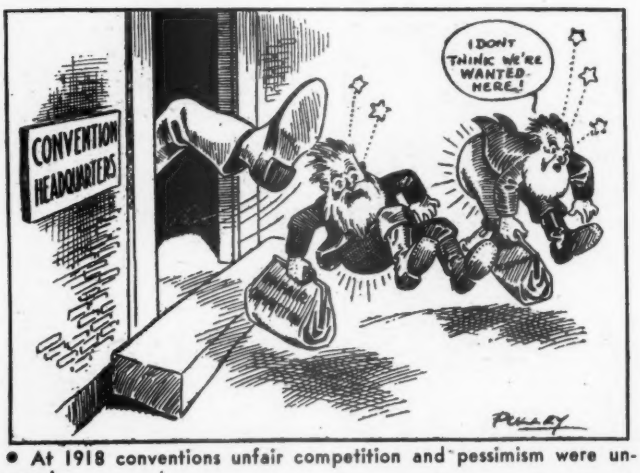
This issue also contained a description of the modern gravel plant of Reinert Bros. at Algonquin, Ill. The Reinert plant was one of the first to scalp out and crush oversize gravel at ground level, all products being carried up to the screening and washing plant on a belt conveyor.

"Why Stock Pile" was the title of an article by R. W. Scherer, secretary of the Wisconsin Crushed Stone Assn. In this article the various methods of storage and reclamation were described and compared on the basis of first cost and operating cost. Mr. Scherer emphatically endorsed the use of plant bins for supplying immediate needs and of ground-level piles with reclaiming tunnel belt conveyors for large-capacity storage.

Other staff written articles in the May issue included one on "Methods of Working Pits". Two important articles, one on the growing importance of highway transportation to industry in general, and the other on the importance of highways as an outlet for aggregates and cement, were written for PIT AND QUARRY by authorities in these fields. "Man of the Industry" in this issue was H. D. Conkey, president of H. D. Conkey & Co., Mendota, Ill., and also of the Illinois Assn. of Sand & Gravel Producers.

A report told of the record output of 93,554,000 bbl. of portland cement in 1917, nearly 2 percent over the 1916 figures. Demand was good, prices and production costs were rising but, believe it or not, "labor and traffic conditions were, for the most part, unsatisfactory".

The production of lime for 1917 was 3,663,818 tons, 10 percent below the 1916 record figure. Prices were rising, but not as fast as production cost and some plants were closing down for this reason and because of shortages of fuel, labor and freight cars.



• At 1918 conventions unfair competition and pessimism were unpopular.

Cement Firms Grant Pay Hike Under New Contract Terms

Five cement manufacturers in eastern Pennsylvania have signed contracts with the Cement, Lime and Gypsum Workers Union granting a wage increase of 10 cents an hour. Eleven other companies are expected to sign within a few days. Those which have already signed are Lone Star Cement Co., Nazareth; Penn-Dixie Cement Co., Bath; Hercules Cement Co., Stockertown; Universal Atlas Cement Co., Northampton; and Lehigh Portland Cement Co., Allentown.

Originally the union asked a graduated wage increase ranging from 10 to 15 cents an hour. Under the plan proposed by Lone Star Cement Co., which later was accepted by all parties to the negotiations the union accepted a 10-cent pay boost and relinquished demands for a union dues check-off and six paid holidays. All other provisions of the contract, which expired April 1, were renewed for one year.

Sulphur Output Lower for October—Higher for 1947

In December, 1947, the output of native sulphur was less than 9 percent below the October record of 425,612 long tons, according to the U. S. Bureau of Mines. Production, mine shipments, and apparent sales for the year surpassed all previous annual records and were 15, 17, and 18 percent greater, respectively, than in 1946. Stocks decreased by 398,334 long tons during the year.

Production for the January-December, 1946, period was 3,859,642 long tons; mine shipments, 4,128,211; apparent sales, 4,094,191; and producers' stocks, 3,769,368. For the same period in 1947 the figures are as follows: production, 4,441,214; shipments, 4,828,103; sales, 4,839,548; stocks, 3,371,034. (Apparent sales are calculated from production and change in stocks during the period; producers' stocks are stocks at mines, in transit and in warehouses at the end of the period.)

• A model of the Portland Cement Association's new laboratory to be built at Skokie, Ill.

World's Largest Cement Laboratory

AROUND May 1, 1948, the Portland Cement Association will break ground for its new research laboratory, which will be built on a 15-acre tract of land in Skokie, Ill., about 15 miles north of Chicago.

According to Dr. A. Allan Bates, the association's vice president in charge of Research and Development, the new lab will be the largest one of its kind anywhere in the world.

The laboratory, designed by Carr & Wright, Chicago architects, comprises two architectural concrete buildings connected by a covered walkway. These buildings have a total floor area of approximately 98,000 sq. ft. The reinforced concrete frame and architectural concrete exterior were designed to give minimum maintenance cost, maximum flexibility for first and future installations and for pleasing appearance. Interior partitions are to be of concrete masonry units. Concrete subfloors will be furnished with terrazzo, composition tile and mastic. The cost of building the new laboratory was reported to be $1,000,000.

The new research facilities will allow scientists to carry out experiments on cement or concrete in surroundings which will simulate climatic conditions colder than the North Pole, hotter than the tropics, dryer than the Sahara, or wetter than the Amazon Valley. Any combination or periodic variation of any of these conditions are possible.

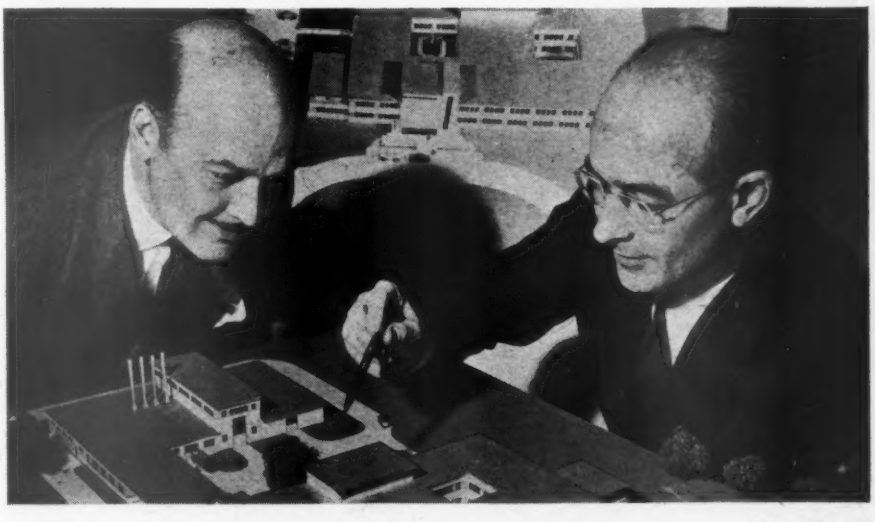
The Skokie development will contain more than 25 specialized laboratories, all equipped with the most modern scientific apparatus. Besides the research facilities there will be an auditorium, a complete technical library, a reading room, a cafeteria, and offices for Frank T. Sheets, president of the P.C.A., Dr. Bates, and other department heads.

In the area devoted exclusively to the Structural Development Section, there will be a 1,000,000-lb. compression testing machine capable of handling specimens up to 10 ft. by 40 ft. There also will be a 400,000-lb. universal testing machine for both compression and tension tests. It is also planned to install a fatigue-testing machine for tensile, compression, static, and impact loading tests. It is planned to cast large specimens. A 15-ton overhead crane will be available to facilitate handling of heavy specimens. This room will also have a ball mill, a crusher, and a gas furnace.

The space occupied by the Basic Research section will include a colloid chemistry laboratory, a general chemical laboratory, and a general physics laboratory. Apparatus for this section will include an electron microscope, a x-ray machine, and general equipment for organic and spectroscopic determination and analysis.

The center section will have one room 10 ft. x 36 ft. with a 32 ft.

(*Continued on page* 66)

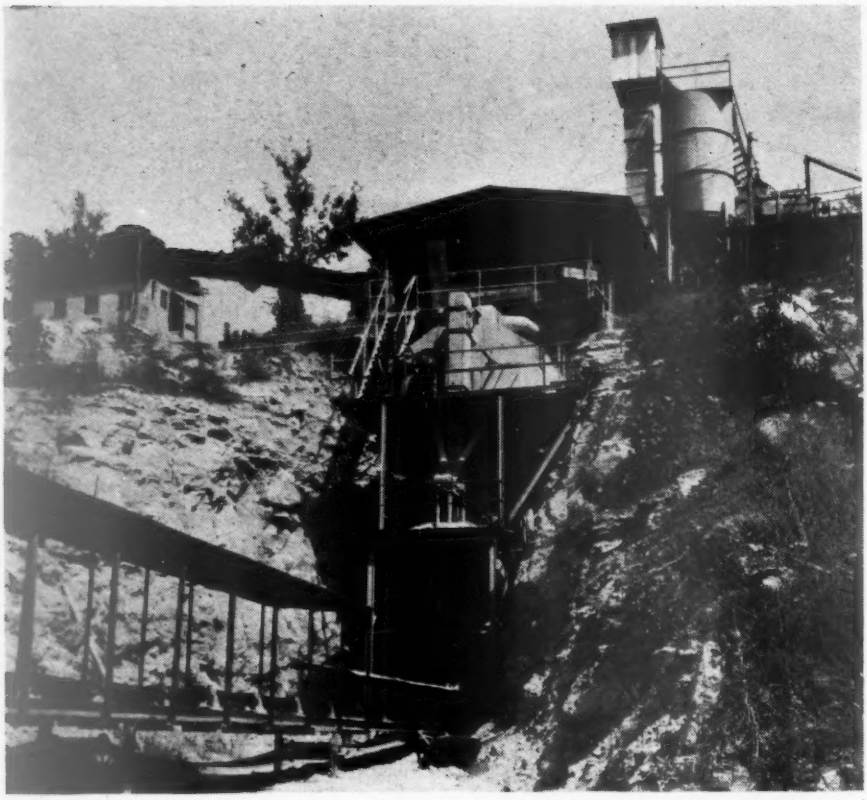


(*Sun-Times*)

• Dr. A. Allan Bates (left) smiles appreciatively as R. Rea Esgar, the architect, points out an unusual feature of the proposed P. C. A. laboratory.

New Plant Multi-Level

Depletion of Silica Sand Deposit Occasions Move To New 100-Acre Property



• This view from the lower level at the Aubuchon Silica Mining Company's plant at Crystal City, Mo., shows how the natural gradient of the site has been utilized to effect gravity flow. The conveyor (foreground) discharges over the siding.

another ON THE SPOT report

ABOUT three years ago (in March, 1945, to be precise) PIT AND QUARRY published an article[1] describing the operations of the Aubuchon Silica Mining Co. located at Crystal City, Mo. In that story mention was made of the fact that the deposit of high-grade silica sand then being worked was limited to a five-year supply, and that the company had just purchased a 100-acre site several miles away from the plant in order to insure the continuity of its operations.

The wisdom of this provision became fully apparent about two years ago when the old deposit showed signs of petering out, both quantitatively and qualitatively, well in advance of the estimated date. Work was begun immediately on an entirely new processing unit located on the new property, and equipment deliveries and construction were so timed that the depletion of the old deposit and the starting up of the new plant coincided within a few days.

The new site, which is known in the locality as Rock Fort, comprises a 100-acre tract, at least 85 percent of which contains the low iron-oxide silica sand required in the manufacture of glass. From 1908 to 1916 J. M. Aubuchon, father of one of the present owners, mined the property underground on a royalty basis, and the rooms left by his operations are now used for storing machinery.

At least for some years to come the present operators will recover by open pit methods, notwithstanding the fact that a fair share of the deposit lies under 12 ft. of limestone and clay overburden. In consequence blasting is necessary for stripping operations as well as for recovery. When the overburden has been broken up sufficiently by blasting, most of the stripping work is carried on with a Caterpillar tractor-bulldozer.

All drilling is done with Ingersoll-Rand jackhammers, with air being supplied by a Jaeger portable compressor. The deposit has an average depth of about 45 ft., and the present practice is to bench down approximately 14 ft. at a time. All shots are fired instantaneously, and an average shot comprises 25 holes 3 ft. apart in a single row. The usual burden is 4 ft. The ½-mile round trip haul from the pit to the processing plant is made with two 5-ton trucks—a Chevrolet and a Studebaker. These units are loaded at the pit with a ¾-cu. yd. Bay City shovel powered by a General Motors diesel engine.

As the accompanying photographs show, in the design of the new plant full advantage was taken of the site gradient to achieve gravity flow wherever possible. The various units of the plant were literally grafted to a hillside flanking the highway which the trucks cross enroute from the deposit, and there is a full 150-ft. drop from the receiving level to the railroad siding at the bottom of the slope. This happy choice of site resulted in a layout requiring only one elevator in the principal flow.

The trucks dump at road level

[1]See *Missouri Silica Sand Plant Making Important War Effort Contribution*, PIT AND QUARRY, March, 1945, page 94.

• A tractor-bulldozer helps strip the 12-ft. layer of clay and limestone overburden. Drilling and blasting are necessary in the stripping operation.

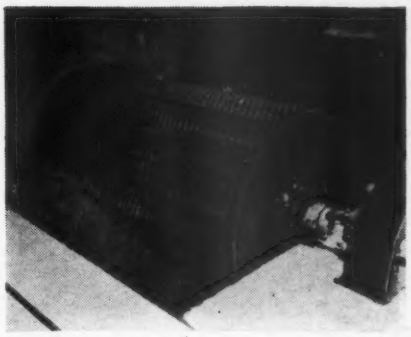
# of Aubuchon Silica Uses Site to Gain Efficiency

into a steel feed hopper located ahead of a 4-ft. diameter by 7-ft. long rotary screen. Breaker bars inside the screen, which revolves at 23 to 25 r.p.m., reduce oversize particles so that the entire feed passes through the 1¼-in. round openings. The material drops from the screen into a 10-ton cone-shaped hopper, and from there flows onto the 24-in. by 25-ft. Goodyear conveyor belt which feeds the rotary dryer. The dryer is 5½ ft. in diameter by 25 feet long, and it is fired with high-pressure natural gas burners. It is set on a slope of ¼-in. per ft. and revolves at 11½ r.p.m. The sand is delivered at a temperature of about 250 degrees F. A 60-in. Buffalo Forge fan exhausts air from the dryer into a cyclone dust collector, thus providing required draft and materially reducing dust nuisance.

The dried product passes through a special cantilever design rotary screen with 30-mesh openings. All oversize material (at most not over 3 tons per hour) drops into a Williams 9- by 12-in. hammermill from which it is elevated back to the screen. From the screen the entire flow ultimately drops into a 200-ton steel storage bin as finished product. The bin straddles a 24-in. by 150-ft. Goodyear belt on which the dried sand is fed to a loading chute suspended over the railroad siding. Covered hoppers are loaded directly by gravity, box cars by means of a Stephens-Adamson box car loader. The 22-car siding permits shifting and spotting cars by gravity.

The new Aubuchon plant, which is of fireproof construction throughout, has a capacity of approximately 150 tons per hour (about double the output of the original plant); and it produces a better product, and does it more efficiently than was possible at the former location. As an adjunct to the main production unit the company has installed a complete washing plant, with a capacity of 50 tons per hour, for supplying high-grade glass sand to the crystal glass trade. The function of the washing plant is to remove extreme fines and to effect a reduction in the iron oxide content of the product.

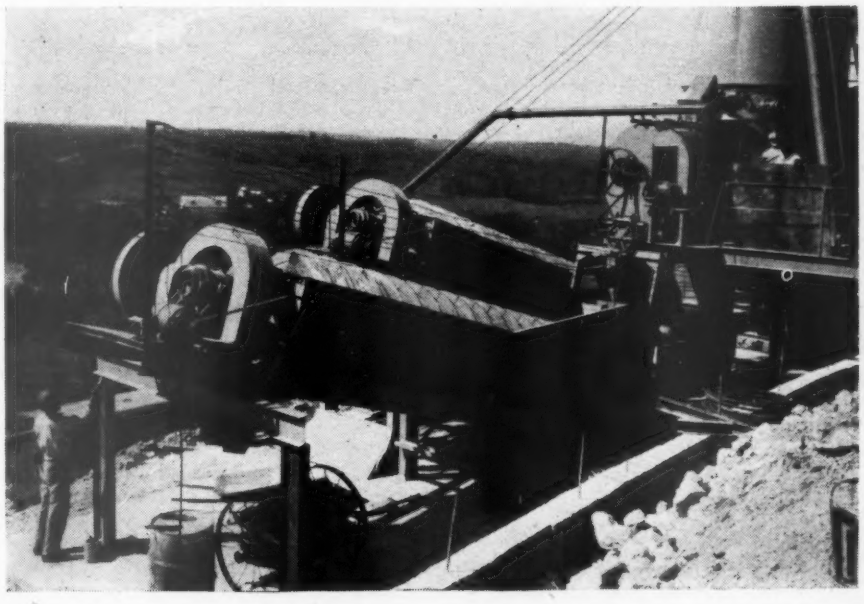
The washing plant circuit starts just below the primary rotary screen, where the sand is removed from a hopper and elevated into a 200-ton storage tank. Sand is drawn from the tank by means of a drum feeder and washed through a 30-mesh rotary screen which measures 5 ft. in diameter by 6 ft. in length. From there the material flows by gravity into the first of two identical 36-in. diameter by 20-ft. high-weir Colorado Iron Works Akins screw classifiers. The discharge from the first unit is fed to the second to effect primary and secondary washing of the product. Water for the classi-

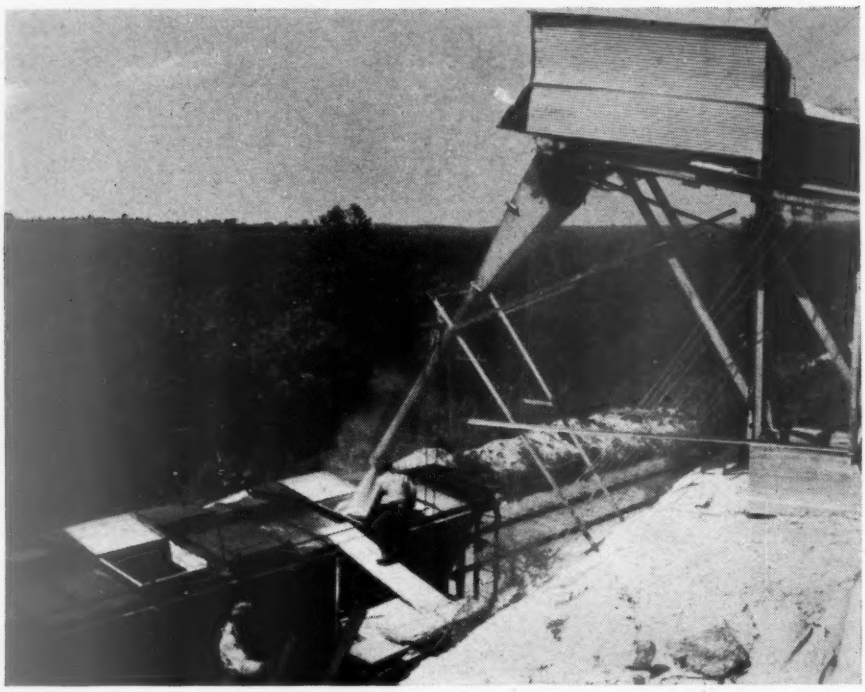


• Above: A rotary screen containing breaker bars reduces the entire feed to minus 1⅜-in. About 2 percent of the product requires reduction in a hammermill; the remainder disintegrates in the rotary dryer.

• Below: Two dump trucks haul 5-ton loads from the deposit to the plant, a round-trip distance of about half a mile. Loading is done with a ¾-cu. yd. diesel-powered shovel.

• Below: The washing plant is designed to operate as an entirely separate unit, supplied from the 200-ton storage tank at the right. The two screw classifiers take out extreme fines and reduce iron oxide to produce a sand suitable for the crystal glass trade.





• The high-discharge conveyor permits gravity loading into covered hoppers. The 200-car siding is 150 feet below the plant roadway.

fiers is supplied by a 300 g.p.m. Fairbanks-Morse pump from a 1,000-ft. well. A Stephens-Adamson stacker piles the end product on a drain bed.

At present this product is being fed by truck back to the main plant for drying, but eventually a separate, conveyor-fed rotary dryer will be installed to handle the classified material. The washing plant reduces iron oxide in the sand from about .030 or .035 percent, as it comes from the deposit, to well below .020 percent. The company's entire output is divided about equally between the glass and foundry industries.

The Aubuchon company is a corporation, with all stock owned by Edgar M. and Ellis J. Aubuchon, president and vice-president respectively.

Investing in Modern Equipment Pays Illinois Producer Big Dividend

TEN years ago, Mr. Edward Olds, owner of Olds Lime & Gravel Co., Rock Falls, Ill., opened his first agricultural limestone and crushed road rock quarry a few miles north of this city. Starting with just one truck, he has built a business that today necessitates the use of five trucks and one hydraulic loader to operate the original quarry, a pit-run gravel pit and a crushed-road-gravel quarry three miles southeast of Rock Falls, where he takes mason sand, torpedo sand, Class "A" and Class "X" gravel and pea gravel from the Rock River. Mr. Olds is said to have the distinction of operating the only washing plant within a 25-mile radius of the twin cities, Rock Falls and Sterling, Ill.

Like many other quarry owners, Mr. Olds found that one of the main difficulties he had to overcome was the method of handling material at his three scattered pits. Rather than buy three loaders, one for each quarry, he bought a Hough Model HF "Payloader" which has solved this problem. The crushed-road-gravel quarry and the pit-run gravel pit are more than a half mile apart, but because of its speed and maneuverability, he shuttles the Payloader between the two, thereby eliminating the investment of two loaders, each of which would be operated only part time.

Periodically, the HF Payloader is moved to the limestone quarry north of Rock Falls to load and stock-pile material. Moving the machine from one quarry to the other is a simple and fast operation, because the unit is equipped with large rubber-tired wheels and can therefore be driven on the highways at a speed of about 20 miles per hour. Thus, three quarries are operated with one loader.

In his present method of operation, Mr. Olds takes gravel from the Rock River with a tight-line cableway and runs it through the screener and washer, which has a capacity of 150 cu. yd. per day. From here it is stock piled with the Payloader and then loaded into trucks at the rate of 20 to 50 per day for sale to contractors and truckers.

• Left: Mason sand is transported from the Olds quarry and stockpiled with the hydraulic loader. All stockpiles are kept close together for faster and more efficient loading of trucks. • Right: Torpedo sand being loaded into a customer's truck at the quarry. This sand is taken from the Rock River and stockpiled a short distance away. As trucks arrive, they are filled by the loader.

Announcement was made recently in New York of an $87,000,000 expansion program near Bogota, Columbia, by the alkali manufacturing industry of that country. H. K. Ferguson Company, representatives of the Instituto de Fomento Industrial, Colombian governmental agency, stated that the new plants will make soda ash and caustic soda.

Prospecting for Limestone in Honduras By Plane and Muleback Express

another P&Q exclusive

HONDURAS, *repub. Cen. Am., 44,275 sq.m.; p. (1940) 1,105,954; cap. Tegucigalpa. p. 40,000.* Armed with this information, culled from our Winston dictionary, the knowledge that Honduras had a rainy season which had caused the postponement

W. R. CLIFFE
Consulting Engineer, L.I.M.E.

of our departure for several months, and an otherwise alarming lack of information concerning our destination, we departed by air from New Orleans on the first lap of an assignment to prospect for high-quality limestone in the Central American tropics.

With a compressor, a diamond drill rig including 300 feet of rod, and other paraphernalia, we took off on Pan American for Tegucigalpa. Had our advance knowledge of Honduran geography been more extensive or our advance agent less given to understatement, we would probably have been better prepared, at least physically, for the rigors of the assignment.

We completed the first leg of our journey uneventfully and set down at Tegucigalpa, the capital, where orderly progress is everywhere in evidence. There, in a delightful climate at an elevation of 3200 feet, an excellent airport, a new and modern stadium, and other public improvements demonstrate the good influence of President Carias, the elderly Indian who is the benevolent dictator of the country.

Although Tegucigalpa shows many signs of a progressive point of view it is still "undiscovered" by the American tourist and retains much of its Old World charm. The Americans there comprise a small but active colony and are wholeheartedly behind the contemporary movement towards enlightenment, while nonetheless enjoying such advantages as accrue from living in a primitive country.

We based our operations in Tegucigalpa and immediately began to collect information relative to limestone deposits—a difficult process when one considers that the American prospectors in the area are more concerned with precious metals than the more plebian minerals and that

W. R. Cliffe

the natives have little knowledge of or interest in limestone deposits. In the absence of authenticated geological surveys we were forced to rely on opinions and hearsay knowledge and consequently were often misled.

However, all information received was carefully plotted on the best map available which, when reasonably complete, became our basic guide. Concurrently, with the aid of T.A.C.A. officials we plotted on our map every landing strip in the country. When we felt that our map was reasonably complete, we were prepared to embark on the second phase of the project.

Our plan for this second phase involved traveling by air with the minimum of equipment to the landing strip nearest the area in which the presence of limestone had been reported, and thence by mule-back and on foot to conduct our search. Suddenly the 44,275 square miles with which the republic is credited expanded enormously. Precipitous mountains, lack of roads, absence of telephone and telegraph service, and of a personal command of Spanish were accountable. No arrangements could be made in advance for guides or mules. Each expedition must be organized when the plane lands and pushed through to completion on schedule.

Our first trip was a hair-raising experience. Leaving from the modern field at Tegucigalpa, we set down on a so-called strip on which the wing tips of our CD-3 brushed rather than cleared the trees of the jungle in which it was cut. Without advance warning, other than that offered by the sound of the approaching plane, a crowd was assembled by the time the plane landed and steps could be taken to find the necessary mules and bushmen for the trip into the back country.

Few variations from this experience were encountered. On Sunday the crowd at the strip might be somewhat larger than usual, at certain fields the small boys might be more inquisitive than was ordinary and a little more forthright in their probings of the elevators, rudders and wings of the planes, but the picture was usually much the same. The American pilots and native co-pilots took the proceedings in good grace. We still recall with some nervous termors one Sunday afternoon when, forced to land because of lack of fuel, the pilots lay casually smoking in the shade of the wings while a hastily organized bucket brigade refueled the plane from two drums of gasoline stowed in the jungle beside the landing strip.

One by one, our scheduled trips were put behind us. In every case our admiration for the scantily clad, inadequately fed natives increased. With their knowledge of the jungle and of the mountain trails and the inevitable machete to make our going less difficult, we were never led astray. In many cases the observation of rock formation presented extreme difficulties and determination of the strike and dip of a ledge of stone required the cutting of large areas of jungle growth. The necessary work was invariably accomplished in the alloted time, and we found ourselves back at the edge of the strip eagerly awaiting the prearranged return of our plane. Not once in our many trips were we disappointed; and in the jungle, where time has little value, we point to this as the outstanding feature of our entire stay.

More often than otherwise, deposits referred to by our informants as "moocha limestone" proved, upon further examination, to be either too limited in extent or too inferior in quality to justify the effort expended in their examination. As time passed, trips of 20 miles on foot and on muleback which earlier had taxed the limits of our physical strength

became routine and bit by bit we accumulated a knowledge of the limestone deposits we had come to explore. We must admit, however, that we never did quite overcome our predilection for a bit to eat and a drink of water at mid-day. Our friends, the Honduran natives, seemed quite well disposed to go without lunch but we must confess that the almost invariable omission of the daily luncheon period seemed almost inexcusable every time we encountered it. We strongly recommend that any person unaccustomed to the rigors of two meals per day make due provision for the requirements of the inner man if business takes him into the jungles at noon.

At the completion of each trip samples of the stone collected were forwarded by airmail to our laboratory at Annville, Pa., for examination. On the sixth day after mailing, Dr. C. R. Atherton, our chief engineer, would be on the radio phone with the results.

Each foray into the back country was pretty much of a duplication of each preceding one. There is an abundance of wild animals and no closed season. Monkeys, baboons, mountain lions, wild cats, wild boars, crocodiles, and wild ducks abound in the area and during our visit it was reported that one hunting party took out 75 deer in two days. Despite the talk of snakes we failed to see one during our entire trip. It was interesting to note that although the natives wore side arms and carried the inevitable machete, the Americans in the republic go entirely unarmed. An American acquaintance advised us that hiring a native Honduran was equivalent to hiring a one-armed man since one arm must be kept free for the machete—but at 72 cents for a ten-hour day we feel sure that most of our friends in the lime industry in the continental United States would not feel overcharged.

After a long series of trips having characteristics similar to those described above two large deposits of stone subject to economical exploitation were prospected. Reports on one of these deposits show calcium carbonate 98.21, magnesium carbonate 1.35, with insolubles less than one-half of one percent. The stone is hard and close-grained in structure and pure white.

On receipt of primary analyses from the home office which indicated stone suitable for the manufacture of high-quality lime, we moved in our core drilling equipment. This consists of a five-ton diesel-powered Caterpillar tractor with 'dozer hauling an Athey half-track trailer on which is mounted an Ingersoll-Rand portable compressor and the new Ingersoll-Rand diamond core drill. The outfit is manned by skilled operators, many of them young Hondurans who volunteered for service in the United States Navy during World War II and there acquired not only skill in the handling of modern machinery but an invaluable knowledge of the English language.

As we near the conclusion of this article we refer once more to source material *The World Almanac* indicates that the principal export of Honduras (65 percent) is bananas, grown on the Caribbean coast. The lime requirements of this country originate in the banana business. The growth of bananas requires lime for two purposes: first, as a basic component in Bordeau Mixture for the control of sigotoka, a dangerous fungus disease, and secondly, in the treatment of Panama-disease-ridden soil. This latter disease, which first appeared in 1936 makes the soil of a given plantation utterly useless for banana propagation in five years from the initial planting. The only remedial measures now known require flooding with water to a depth of two feet for a minimum of two years followed by treatment with lime at the rate of ten to fifteen tons per acre. As matters now stand, a plantation can be in production for five years and must then be retired for three years. If a method could be found whereby a given plantation could be maintained in continuous production, its effect on the banana industry would be of inestimable value.

Now that preliminary investigations have been completed and the existence of high-quality limestone has been established, a number of field parties composed of young civil engineering graduates educated at the University of Tegucigalpa are mapping large areas, and extensive core drilling continues. A period of six months or more may be required before the detailed results of our survey become available.

Having now returned to the United States to exercise supervision of the operation at long range, we look back with pride on the extent of our accomplishments in the short time available, with humility when we understand the burdens and abilities of our native guides, and with hope when we recognize the capacities and potentialities of our good neighbors to the South.

Largest Cement Laboratory

(*From page* 61)

ceiling height, devoted to industrial processes. This room will contain storage bins, a tube mill, a jaw crusher, an autoclave, a pilot-size rotary cement kiln and an air separator. There will be a two-ton electric overhead crane and a 10-ton manually-operated crane. Rooms adjacent to the center section will contain the heating plant and a room for the crushing and grading of aggregates. There will be two small aggregate crushers, rotary screens, and a dryer.

During a recent press preview at which a scale model of the laboratory was displayed, Dr. Bates made the following remarks:

"It is not generally realized that portland cement chemically and physically is one of the most complex of all modern engineering materials and that it is produced under the most refined chemical control.

"The problems arising from these characteristics of portland cement involve not only the most immediately practical experimentation, but also the most refined and advanced approach which modern science has developed including some branches of atomic physics. It appears, indeed, that concrete is to be the fundamental building material of the atomic age."

Russian Production Figures Show Uneven Progress in '47

According to statistics released by the State Planning Commission of the Soviet Union on economic achievements in 1947, the colossus of the East has made swift progress in reconstruction and post-war development. In several categories involving basic industries, however, the percentages of increase over 1946 production fell short of the planned goals, as reported in *Pravda* on January 18, 1948.

Cement plants, it was hoped, would turn out a total 71 percent over the previous year's figure, but hit 40 percent instead. Steel production increased by 9 percent, whereas the goal had been set at 19 percent; coal missed the target by a difference of 4 percent; tractor output, expected to show a 187 percent increase, actually made a 100 percent gain.

Riverside Cement Company Does Million Dollar Business

The Riverside Cement Co. of Los Angeles reports for the year ending Dec. 31, 1947, that net earnings amounted to $1,046,415, equal to $4.16 per share on the 240,000 shares of Class A stock on which dividends of $17.48 a share are in arrears.

This compares with a net of $805,399 in 1946, equal to $3.16 per share on the same number of outstanding A shares.

PIT AND QUARRY Special

ELEVENTH ANNUAL LIME and AGRICULTURAL LIMESTONE SECTION

UNAX ROTARY KILNS
for BURNING LIME *or* CEMENT

RIVETED CONSTRUCTION or WELDED CONSTRUCTION

The UNAX KILN for burning lime or making cement clinker, operates with very low fuel consumption, producing a product of high quality and uniformity.

The UNAX COOLER is integral with the kiln, providing efficient cooling by means of the air for combustion which in turn is preheated to a high degree.

Other SMIDTH products include a complete line of granulating and pulverizing mills, such as BALLMILLS, TUBEMILLS, UNIDAN COMPARTMENT MILLS, TIRAX MILLS, ETC.

F. L. SMIDTH & CO.

11 WEST 42ND STREET — Engineers — NEW YORK, N. Y.

THE HERCULES Model F-55 LIME SPREADER

EASY, EFFICIENT, PROFITABLE OPERATION

WIDTH OF SPREAD—40 FT. (AT APPROX. 5 MPH)

SIMPLE MECHANISM

OVERSIZE PARTS

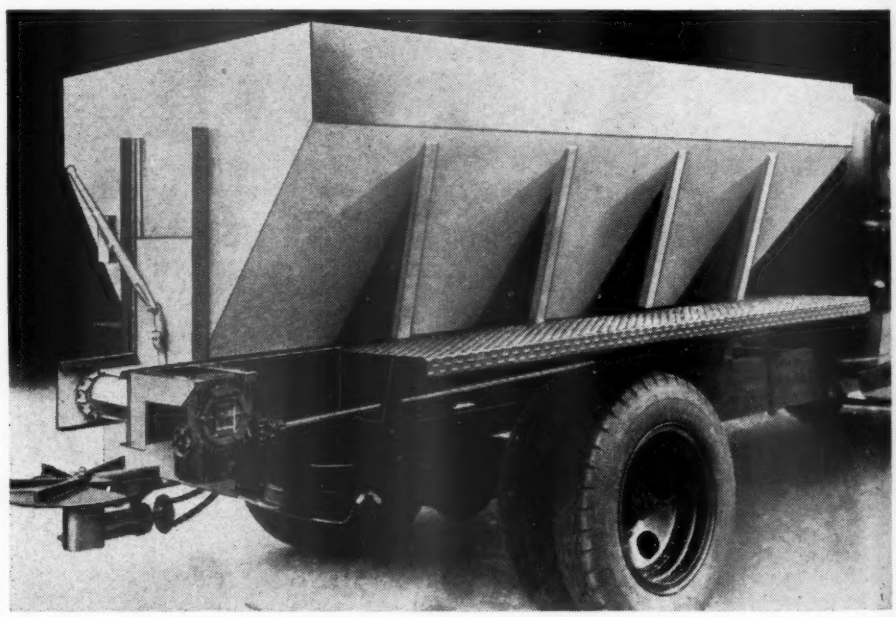
FLEXIBLE BODY DESIGN

CAN BE MOUNTED ON ANY STANDARD TRUCK CHASSIS

The product of years of design, engineering and manufacturing experience, the Hercules Lime Spreader is a soundly-designed precision-built unit that provides dependable, profitable performance under the typical operating conditions found on the average farmland. Welded steel hopper type body, with steep sides reinforced with flanged steel ribs. All-steel, two-chain drag conveyor moves material at uniform rate. Spinner disc driven by fully enclosed gear box and roller chain. Sliding gate permits easy control of depth and width of spread. Designed and built for dependable, economical operation. Complete details available...write today.

SPECIFICATIONS

Width of spread	40 ft.
Body length	132 in.
Body width	72 in.
Body height (above chassis)	50 in.
Overall width, including running boards	94 in.
Capacity, level, full	5½ cu. yds.
Overall length, back of cab	156 in.



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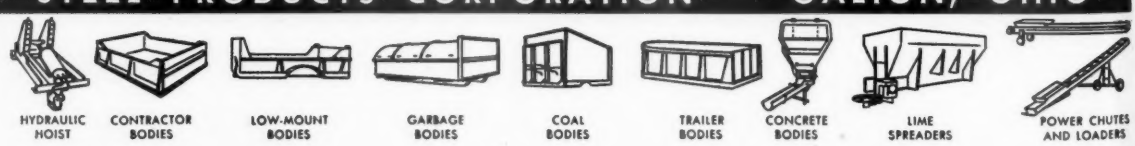

HYDRAULIC HOIST | CONTRACTOR BODIES | LOW-MOUNT BODIES | GARBAGE BODIES | COAL BODIES | TRAILER BODIES | CONCRETE BODIES | LIME SPREADERS | POWER CHUTES AND LOADERS

Charlie said—"Yes!"...

Twice!!

When a quarry operator orders a second plant from the same manufacturer, you can be sure the first plant paid out well.

So, when Charlie Langford of Gallatin, Tennessee ordered his second PIONEER Quarry Plant, we were mighty pleased. He's been in the quarry business for over 29 years and knows what equipment produces more material at the lowest cost per ton.

Saying "yes" a second time is becoming more and more of a habit with men who own and operate PIONEER equipment. We're proud of our "Repeat Orders" because they are proof that sound engineering, good design and a few PIONEER "extras" are *producing more for less.*

Take Charlie's second PIONEER plant located at Cookeville, Tennessee. In seven months it produced over 250,000 tons of road aggregate and ag-lime—maintenance was less than $250.00 . . . less than 1/10c per ton.

For complete details about PIONEER Quarry Equipment, or for the address of your closest "PIONEER neighbor" who'll give you first hand facts—write us today.

PIONEER ENGINEERING WORKS
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Ask Charlie Langford about his 3' x 10' and 3' x 6' Triple Deck Vibrating Screens arranged in tandem. He'll tell you that this positive-throw, inclined screen can't be beat for clean, efficient separation of materials.

Since C. A. Langford's first Pioneer plant went into production at Gallatin, Tennessee. Production has exceeded 250,000 tons of road aggregate and ag-lime in a single year.

BUY BOTH!

Higher Output, Lower Upkeep!

Pioneer

Continuflo **EQUIPMENT**

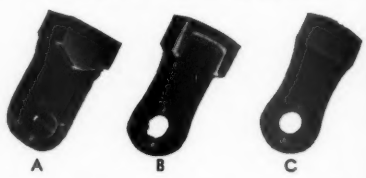
HERE'S 5 WAY EFFICIENCY for YOUR CRUSHING OPERATIONS

with wide range of reduction at low cost

1. **Capacities up to 250 tons per hour.**
2. **Wide range of reduction.**
3. **Uniformity of sizing.**
4. **3 Styles of hammers.**
5. **Center feed, or front feed for controlling fines.**

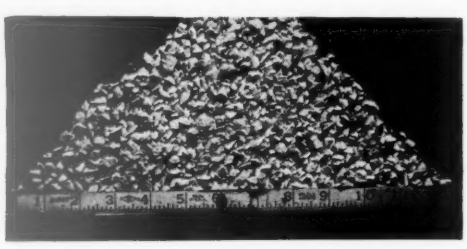
The new American "ACS" Crushers are produced in sizes to cover every requirement—to answer every problem. "ACS" are furnished with conventional front feed for minimum fines, or with center feed for producing a finer product containing a maximum amount of fines with hopper opening centered over rotor, material falling well back on rotor, subjecting the material to longer travel in hammer cycle. Whether your operation is one step or closed circuit American Crushers will perform efficiently on any hardness of stone, and with uniform, individual size control—for road-stone, aggregate, and agstone, without slivers or finger stones.

Cross Section View of American "ACS" Type, showing actual crushing action.



A B C

Types of Hammers engineered to fit the job: A—"Brute" for heavy reduction. B—"Broadhead" for medium reduction. C—"Splitter" for fine reduction.



Typical Example of screen analysis for limestone produced by "ACS" Crusher using 2½" grate bar openings, shows

4.4% passing 2½" Screen—retained on 1½" Screen.
13.2% passing 1½" Screen—retained on 1" Screen.
18.7% passing 1" Screen—retained on ¾" Screen.
19.8% passing ¾" Screen—retained on ½" Screen.
16.5% passing ½" Screen—retained on ¼" Screen.
13.2% passing ¼" Screen—retained on ⅛" Screen.
14.2% passing ⅛" Screen.

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American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1251 Macklind Avenue
St. Louis 10, Mo.

Lake boats supply pulverizers 260 miles from quarry

Michigan agstone producer's new plant has potential of 350,000 tons annually

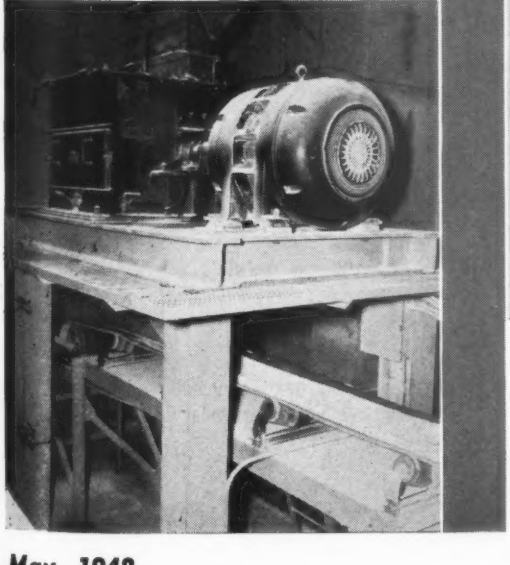
By William M. Avery

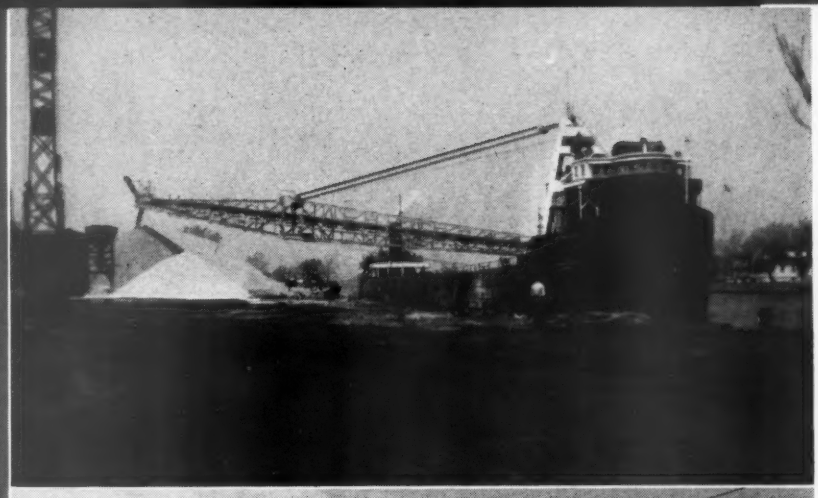
another ON THE SPOT report

FOR obvious reasons the production of agricultural limestone is usually carried on in fairly close proximity to a stone quarry or to other sources of material high in calcium carbonate content. If no other factor were involved, the low selling price of the product would militate strongly against its production at any considerable distance from a suitable deposit of limestone. At St. Joseph, Mich., however, the Terminal Materials Co., a father-and-son partnership consisting of A. S. and Bela G. Lindenfeld, has built up a prosperous agstone business more than 250 miles away from its source of raw stone.

Since it started agstone operations in 1935, the history of this concern

• A view of one of the hammermills, showing the somewhat unconventional steel framework on which it is mounted.





• Top: The 210-ft. unloading boom on the S.S. "J. S. Ashley" places raw stone at any point on the Terminal Material Company's stockpile. Stone comes from a quarry at Manistique, Mich.
• Center: A general view of the company's new pulverizing plant at St. Joseph, Mich. A stockpile with underground tunnel conveyors is behind the building.
• Bottom: Practically the entire output of the plant is sold on a spread basis, for the most part by contract haulers. Here a Baughman spreader loads under one of the truck bins.

• Terminal ships 50,000 to 60,000 tons of aggregates annually, using this ⅜-cu. yd. gasoline-powered crane for loading cars and trucks from stockpiles.

has been one of steady expansion based on demand largely created through the service it rendered. Initially the company marketed a stone sand which it purchased in prepared form from the Inland Lime & Stone Co. at Manistique, Mich. Farmers in the St. Joseph area readily accepted this material, which the company spread on their fields with its own truck, but some objections were raised by the A.A.A. that the material was too coarse. Accordingly, in June, 1942, the company installed its first grinding plant, using raw stone supplied by Inland. This plant, with its capacity of about 60,000 tons per year, took care of the company's requirements and gave satisfactory performance until late in 1946, when initial work was started in a new and much larger setup designed to keep pace with the soaring demand. This installation was completed and placed in operation in June, 1947.

Like its forerunner, the new plant operates on ¼- by 1½-in. washed stone brought down from Manistique by self-unloading lake boats. These bring the stone to Terminal's own dock on the St. Joe River in loads ranging from 7,000 to 10,000 tons, and unload with booms sufficiently long (up to 210 ft.) to reach any point on the stockpile. During the shipping season, from April to November, enough stone is received to handle current production and to accumulate a 40,000-ton stockpile to carry the plant through the winter months. Even the largest vessels can be unloaded in about 6 hours.

Stone is reclaimed by two 24-in. by 140-ft. conveyor belts located in concrete tunnels under the storage pile. By using two conveyors, built at right angles to the river bank, an unusually high live storage ratio was obtained, and the plant was also protected against complete shutdown in the event of mechanical trouble in either tunnel. In the entire design this dual layout principle was adhered to quite closely, with the result that either half of the plant can function independently.

Manually operated gates, located at 20-ft. intervals in the tunnel roofs, control the flow of stone onto the reclaiming conveyors. To facilitate flow and prevent bridging, each chute is equipped with a Syntron U-55 vibrator. When the stockpile has been depleted to the point where steady gravity flow is no longer possible, a bulldozer is used to move the stone over the tunnel gates. Ventilation ducts in the roofs of the two tunnels permit the use of forced hot air to keep the storage pile from freezing in severe winter weather. This system was successfully worked out by Terminal in the original plant, in which a domestic hot-air furnace and a small Buffalo Forge fan supplied enough heat to keep the stone flowing during even the coldest weather.

Each reclaiming conveyor discharges into a continuous bucket elevator which lifts the stone about 25 ft. From this point the flow is by gravity, through a steel chute, directly into one of the two Pennsylvania C4-30 reversible hammermills. In place of conventional concrete-pier mountings, these mills are set on welded steel platforms which stand 9 ft. 6 in. above the plant floor level, giving full access to the machines from all sides and from below. Instead of cross bracing the platforms, heavy H-beam sections were used throughout to give them the required weight and rigidity.

Grate bars in the mills are spaced at ¼ of an inch, giving the machines a guaranteed production rating on ¼- by 1½-in. stone of about 25 t.p.h. each. Actual production has averaged much closer to 35 t.p.h., perhaps at least in part due to the company's insistence on the use of 125-hp. motors in place of the 100-hp. drives recommended by the manufacturer. Experiments by the operators have indicated that an additional production of 10 t.p.h. per mill would result if vibrating screens were placed in the circuits to take out water and permit fines to bypass the hammermills. This change, which Terminal contemplates making some time this year, will increase the output of the plant to about 90 t.p.h.

Westinghouse Mot-O-Trol controls give the mill drives stepless, wide range d.-c. motor speeds from the available a.-c. supply, eliminating line starters and field rheostats. These electronic controls regulate the speed of the drive motors under varying loads and permit speed variations within a wide range at any time.

The steel platforms which support the mills are on a common centerline, straddling two short 24-in. belt conveyors on which the pulverized material is fed to an enclosed hopper at the center of the building. From this point, the product of both mills is elevated some 65 ft. or well above the roof of the plant, where it is resplit into two streams. This main finished-product elevator has 20- by 8- by 11⅝-in. buckets, travels at 85 f.p.m. and has a rated capacity of 100 t.p.h. By means of a flop gate which can be operated from below, the flow of finished product may be divided equally between two cross conveyors, or fed entirely to either one, since each is rated at 100 t.p.h. capacity. The cross conveyors, which feed in opposite directions away from the elevator, carry 24-in. belts and measure 33 ft. 7 in. from head shaft to tail shaft. They discharge into truck loading bins located at either end of the plant building. The bins have a combined capacity of about 105 tons, and they are completely enclosed to protect the material from rain. Terminal's finished product sets rather rapidly under moist storage conditions, and as a result open-air stockpiles are not feasible. Sheltered storage areas are accordingly being developed by building wing walls out from the corners of the plant structure, using concrete to a point about 6 ft. above grade, and corrugated steel sheets above and for the roof. This will provide for about 6,000 tons of finished product, or enough to carry the plant through most periods during which bad weather interferes

with spreading operations. The truck bins will continue to be used for loading out current production as much of the time as possible in order to minimize rehandling.

Many seemingly minor features of the Terminal plant merit special comment. In the design stages the Lindenfelds wisely decided that the new plant must have the maximum interchangeability of parts. To achieve this all conveyors were made 24 in. wide, and all appurtenant bearings, pulleys and idlers are identical. As protection against unforseeable changes in stone supply, the plant was equipped to handle material up to 4 in. Since raw stone costs are relatively high due to the 260-mile lake haul from Manistique to St. Joseph, the company has made it a practice to keep a watchful eye on production costs. Actual cost records of every phase of the operation are kept on a day-to-day basis through daily mill reports, which show start, stop and running time, reasons for all production delays, tonnages produced, number of trucks loaded, and other pertinent data. As an additional measure of cost control, as well as protection against production delays, Terminal operates a well-equipped shop for fabricating and machine work. All the trusses and bar joists for the new mill building were fabricated in this shop.

From the time of its first entrance into the agstone field Terminal has operated its own spreaders. At present the company operates only one Hi-Way Equipment spreader of its own in addition to one truck for handling the small volume of dump business. The bulk of the spreader business is handled by contractors whose units bring the total available spreader fleet to 10 or 12. At present all shipments are by truck within a radius of 35 to 40 miles, but some rail shipping is in prospect for the near future. Deliveries are made in Berrien, Cass and Van Buren counties, as well as in northern Indiana. With the new facilities operating on a 24-hr. basis the company now has a productive potential of 350,000 tons annually. In addition the company stocks and sells 50,000 to 60,000 tons of aggregates per year, including asphalt premix for roads and driveways, and it is the only concern in the county that stocks state specification materials. Aggregates are reloaded from stockpiles with a ⅜-cu. yd. gasoline-powered Michigan crane. A. A. A. tests of Terminal's agstone show an average calcium carbonate equivalent of 97.9 percent, with 100 percent passing the No. 4 screen and 41.3 passing the 100-mesh.

The Lindenfelds took an active part in the formation last year of the Michigan Soil Builders Assn., and went to Washington with other members to protest the drastic curtailment of the A. A. A. program. The state association now has about 100 members.

All material-handling equipment for Terminal's new plant, including conveyors, bucket elevators and appurtenant equipment, were designed and supplied by Link-Belt Co. The 24-in. belts are all 5-ply Manhattan Homochord with ⅛-in. cover and 1/16-in. backing. Fairbanks Morse Co. furnished all the electric motors.

• Below: Electrical vibrators mounted on the tunnel chutes assure a steady flow of stone.
• Right: For convenience all controls for each pulverizer circuit are mounted together.

1947 Incomes, Earnings Expand For Five Large Operations

Statistics released by five major nonmetallic minerals companies for the year 1947 present interesting information.

The net income of the United States Gypsum Company was $16,531,444, equal to $10 a share and comparing with $12,413,944, or $9.90 a share in 1946. Sales rose 27 per cent to a total of $108,405,538 in 1947.

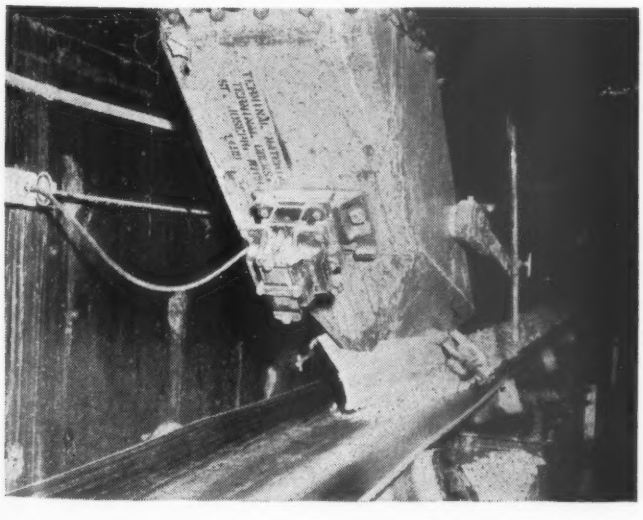
A net profit of $5,273,120, equal to $2.89 a common share after providing for dividends on the preferred stock was reported by the National Gypsum Company for the year 1947. This compares with the net profit of $4,023,952 in 1946, or $2.21 on a common share. President Melvin H. Baker stated that sales of $51,764,326 for the year exceeded those of 1946 by $13,707,414, a 36 percent increase. He added that higher wages and production costs had necessitated an expenditure of nearly $20,000,000 additional "to produce its 1947 volume than it would have cost in 1939."

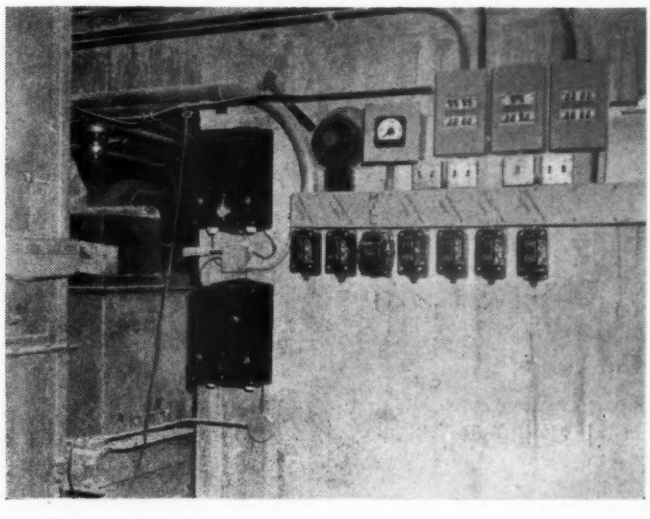
The Texas Gulf Sulphur Company reported for the year ending December 31, 1947, a net income of $21,665,011, equal to $5.64 a share on the capital stock. This compares with a net income of $15,239,520 or $3.97 a share on the same stock total in 1946.

Lone Star Cement Corporation figures showed a consolidated net profit for 1947 of $6,329,700, equal to $6.67 a share, as compared with $5,293,214 or $5.58 a share in 1946. Sales were reported as $46,962,362, against $39,848,125 in 1946.

The net income of the General Portland Cement Company for the 12 months ending December 31, 1947, totaled $2,625,100, after provision for federal income taxes, as compared with net income of $1,956,900 for the corresponding period of the preceding year, according to Smith W. Storey, president. These earnings were equal to $2.62 a share on 1,002,323 shares of common stock outstanding, as compared with $1.95 a share for the 12 months of 1946. Net sales for the period amounted to $14,711,700 as compared with 1946 sales of $12,042,400.

The 1947 figures include operations of the Florida Portland Cement Company, Signal Mountain Portland Cement Company and Trinity Portland Cement Company for the 1½ months from January 1, 1947, to February 19, 1947, prior to their consolidation to form General Portland Cement Company. The 1946 figures represent the total operations of these predecessor companies.





Heat Balance of Down-Fired Lime Kiln Approaches the Ideal

By T. R. ELLERBECK

A revolutionary principle of down-firing part of the calcining gases has been incorporated in the operation of the Ellernan calciner, along with automatic temperature control. These calciners were designed for low temperature calcination of small-sized limestone and are automatic continuous-flow kilns.*

Since this unit has a positively-controlled cooling air circuit and an external oven in which the firing and tempering of the calcining gases take place, it was a fairly simple matter to provide for down-firing and recirculation of waste heat from both the calcining gases and the hot lime. Both of these sources of waste heat must be utilized to the fullest extent, if low fuel consumption is to be attained.

The lower set of tunnel beams and the cooling header makes it possible to remove at this point all of the cooling air which has been preheated in cooling the lime. By circulating this cooling air to the oven, the heat contained in the lime when it leaves the calcining zone is reclaimed. (Fig. 1)

The waste heat contained in the main calcining gases is reclaimed in an entirely new way. Kiln gases are of no further use for calcining after they have been reduced in temperature to around 1600 deg. F., and that part of these gases which is to be recirculated should be removed from the kiln at approximately that temperature for maximum efficiency. In this kiln some of the calcining gases are taken up through the stone in the normal way. These gases do all the preheating but effect only a part of the calcination. The rest of the calcining gases rather than passing up through the stone bed, are fired down through the partially-calcined material and withdrawn from the kiln at the cooling-air header. These down-fired gases complete the calcination of the lime and then enter into the cooling air circuit at a temperature of approximately 1650 deg. F. The spent calcining gases mix with the cooling air before withdrawal from the kiln, and the resultant temperature of the recirculated gases is low enough that they may be quite easily handled. This mixture of gases, containing the waste heat, is recirculated to the firing oven and furnishes a large part of the oven heat requirements.

By properly balancing the oven, cooling air header and hood drafts, any desired percentage of the calcining gases may be down-fired, and any required weight or volume of the recirculated gases can be maintained.

The calcining gases are tempered with recirculated gases to any desired temperature before being admitted to the calcining chamber. With *any* vertical lime kiln, for each particular temperature of the calcining gases, there is a definite minimum amount of heat which the calcining gases *must* contain in order to calcine a ton of lime. This is called the *basic heat requirement*, whose amount varies inversely with the temperature of the calcining gases. This basic heat requirement can be easily calculated. Calcining gases leaving the oven must contain sufficient high-temperature heat over 1500 deg. F. (the minimum temperature at which lime may be calcined) to furnish the dissociation heat of 2,424,000 B.t.u.s per ton of burned lime. At a temperature of 2500 deg. F., the calcining gases can only contribute calcining heat in dropping from 2500 to 1500 deg. or a temperature differential of 1000 deg. F.

The number of pounds of calcining gases necessary to carry the calcining heat is:

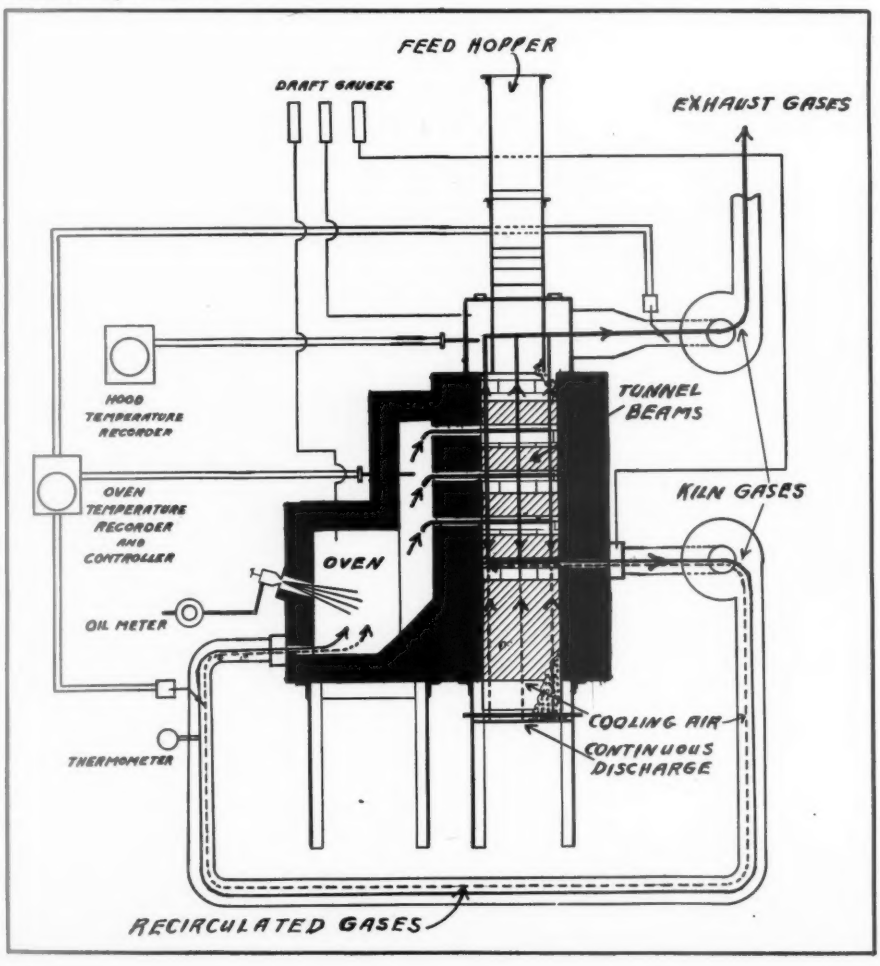
$$\text{B.t.u.s required} \over \text{sp. heat of the gases} \times \text{temperature differential}$$

$$\text{or } \frac{2{,}424{,}000}{.285 \times 1000} = 8{,}500 \text{ lbs. per ton of lime.}$$

8,500 lbs. of calcining gases will have a *total* heat content over 60 deg. F. of pounds × sp. heat × temp. diff. (over 60 deg.) or 8,500

*Several articles on this kiln have been published in PIT AND QUARRY since May, 1942, describing their general operation in detail—Editor.

● Fig. 1. Flow diagram of the Ellernan calciner, showing how heat contained in the lime is reclaimed by circulation.



$\times .270 \times 2440 = 5{,}600{,}000$ B.t.u.s per ton of lime.

Adding on 300,000 B.t.u.s per ton of lime for radiation losses makes 5,900,000 B.t.u.s required per ton of lime burned and increases the weight of the calcining gases necessary to carry this total heat to 8,960 lbs. This is the *basic* heat requirement at 2500 deg. F. calcining gas temperature. If calcining is to be done with 2500 deg. gases, minimum oven *output must be* 8,960 lbs. of calcining gases at 2500 deg., and they will contain 5,900,000 B.t.u.s per ton of lime burned. This basic heat requirement at 2500 deg. remains constant regardless of whether all of the heat comes from the fuel or whether a part of it comes from recirculated waste heat. Chart No. 1 shows this *basic* heat requirement as related to other oven or calcining gas temperatures.

This basic heat or oven output is used up in several different ways. Again taking the basic heat of 5,900,000 B.t.u.s per ton of burned lime required at 2500 deg. F. oven temperature and breaking it down, we find that it must first furnish the radiation loss of 300,000 B.t.u.s per ton. This leaves a balance of 5,600,000 B.t.u.s. From this must next come the calcining heat of 2,424,000 B.t.u.s per ton, which is used up in the calcining zone. Deducting this amount, leaves a balance of 3,176,000 B.t.u.s of heat over 60 deg. F., leaving the calcining zone. This must furnish the heat necessary to preheat the stone, which is 1,724,000 B.t.u.s per ton of lime. This represents the amount of heat which would be leaving the preheating zone as waste heat in the kiln exhaust gases. The basic heat requirement of 5,900,000 B.t.u.s per ton of lime would also represent the fuel requirement if no waste heat were reclaimed in operating the kiln, and the heat balance would be as follows:

Basic Heat Balance at 2500 deg. Calcining Gas Temperature (No waste heat reclaimed)

	BTUs per Ton of Lime
Calcining heat	2,424,000
Preheating	1,724,000
Waste heat in exhaust gases	1,452,000
Radiation losses	300,000
	5,900,000

The lime leaving the calcining zone at 1650 deg. F. contains 764,000 B.t.u.s per ton, and this represents heat that can be reclaimed. This is a part of the basic heat which originally went to preheating the stone. The 1,452,000 B.t.u.s of waste heat contained in the exhaust gases is over and above that required to preheat the stone and may also be reclaimed. The total heat available for recirculation to the oven is the total of the 764,000 B.t.u.s in the lime leaving the calcining zone and the 1,452,000 B.t.u.s excess waste heat leaving the calcining zone or a total of 2,216,000 B.t.u.s per ton of lime burned. If this total waste heat is recirculated to the oven, it furnishes that amount of the *basic* heat or oven output required. The fuel required is only that necessary to make up the difference between the required oven output and the heat furnished by recirculation. In this case of 2500 deg. oven temperature the fuel requirement is 5,900,000 less 2,216,000 or 3,684,000 B.t.u.s per ton of lime. This represents 24½ gallons of 150,000-B.t.u.-per-gallon oil per ton of burned lime.

Taking a lower temperature of 2400 deg. oven or calcining gas temperature, the temperature differential which determines the heat available for calcining is 2400—1500 or 900 deg. F. Using this figure, we find that the *basic* heat requirement at 2400 deg. is as follows:

The number of pounds of calcining gases necessary to carry the calcining heat at a 900 deg. temperature differential is:

$$\frac{2{,}424{,}000}{.285 \times 900} = 9{,}460 \text{ lbs. per ton of lime.}$$

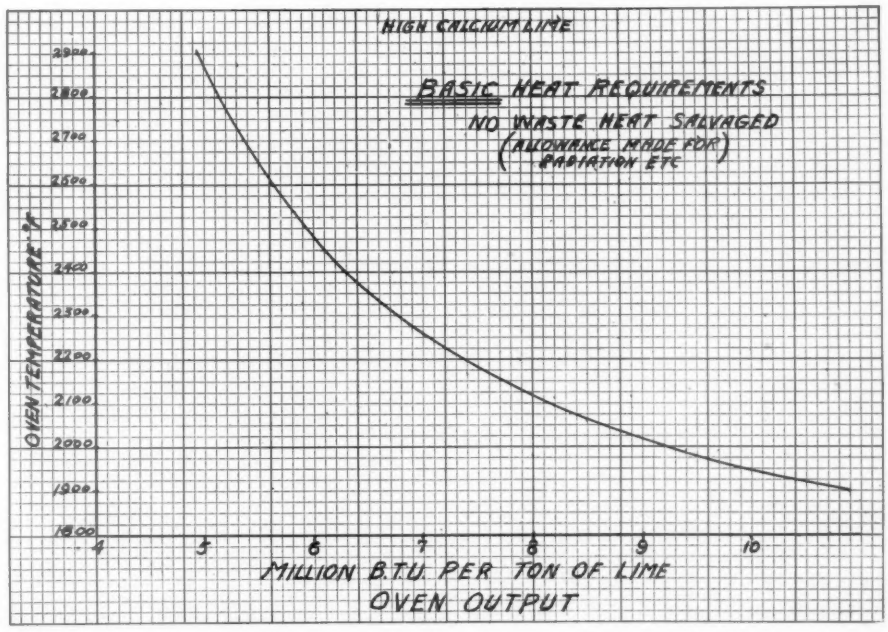
9,460 lbs. of calcining gases will have a total heat content over 60 deg. F. of $9{,}460 \times .270 \times 2{,}340 = 5{,}980{,}000$ B.t.u.s per ton.

The *basic* heat requirement then at 2400 deg. becomes 5,980,000, plus 300,000 for radiation losses or a total of 6,280,000 B.t.u.s per ton of lime. (Chart No. 1)

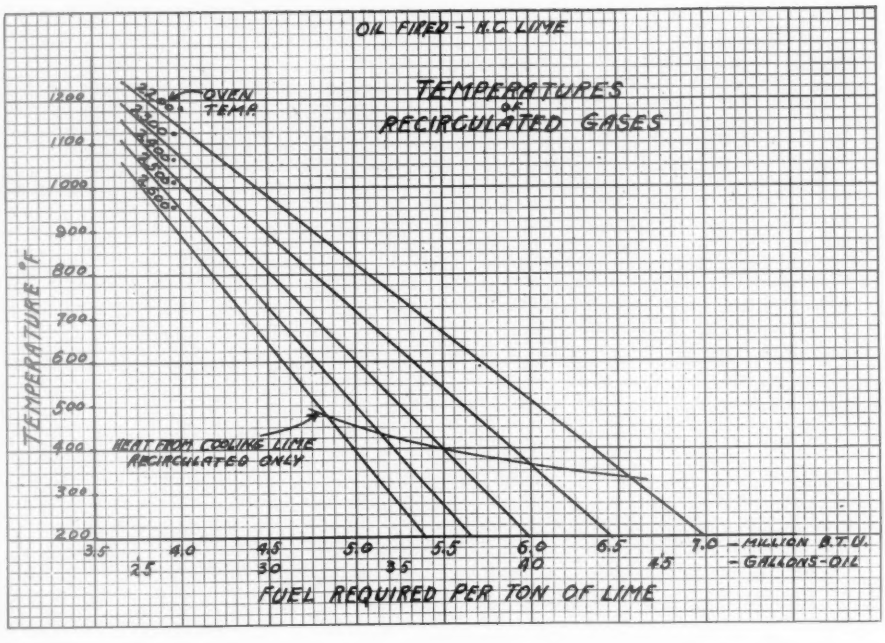
The heat required to calcine and preheat remains the same, as well as the heat contained in the burned lime leaving the calcining zone. The only change in the *basic* heat balance at 2400 deg., as compared to that at 2500 deg., is an increase in the waste heat in the exhaust gases.

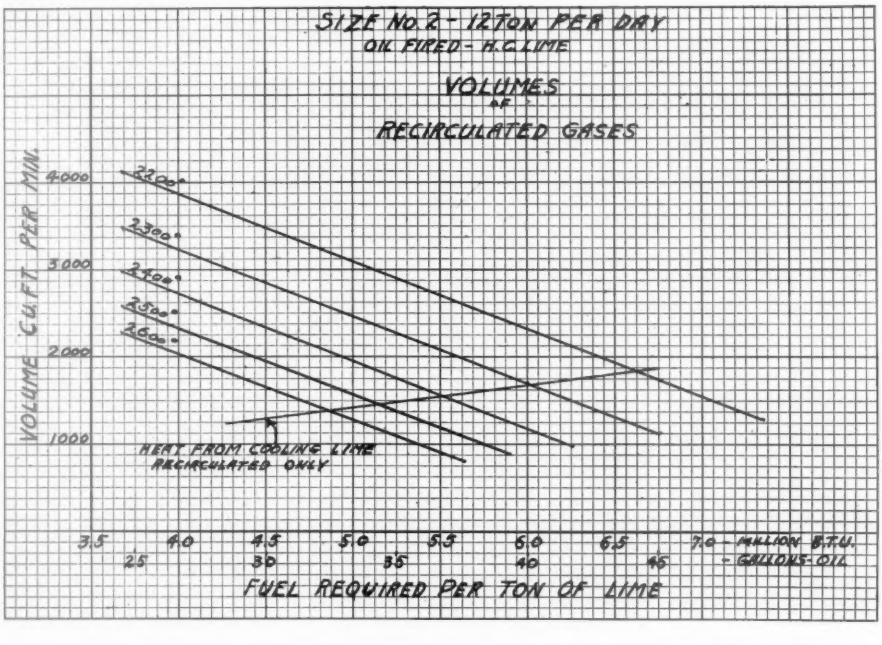
The basic heat requirement of 6,280,000 B.t.u.s less the heat consumed by calcining, preheating and radiation loss is 6,280,000 less 4,448,000 or 1,832,000 B.t.u.s, which would be contained as waste heat in the exhaust gases. Again, this waste heat is available for reclaiming as well as the heat contained in the burned lime. If both these sources of waste heat are fully reclaimed, the fuel requirement at 2400 deg. oven temperature will be the *basic* heat requirement of 6,280,000 B.t.u.s less the total waste heat or 6,280,000 less 2,596,000 (waste heat in exhaust, 1,832,000 + waste heat in lime, 764,000) = 3,684,000 B.t.u.s, the net fuel requirement per ton of lime. This is the same net fuel requirement as for 2500 deg. oven temperature. This minimum net fuel requirement of 3,684,000 B.t.u.s or 24½ gal. of oil per ton remains the same for any calcining gas temperature, within operational limits, if available waste heat is properly recirculated.

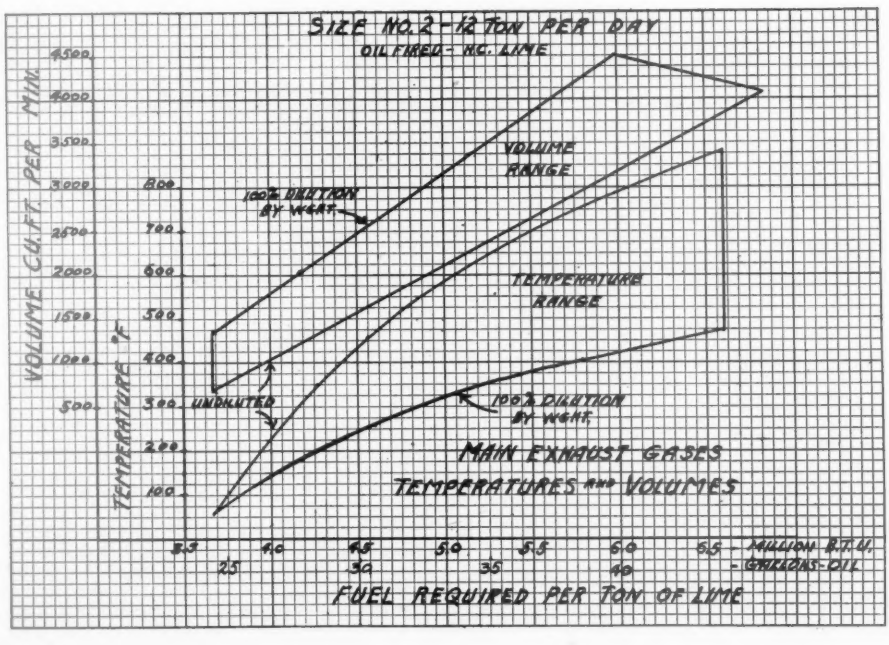
The limiting operational factors determine upper and lower temperature limits beyond which practical operations are not feasible. If calcining gas temperatures much above 2600 deg. F. are maintained, the refractory life becomes relatively short and unsatisfactory. If calcining gas temperatures are much



• Chart 1, showing basic heat requirement.







below 2200 deg. F., *maximum* fuel efficiency cannot be easily secured since the temperature and volume of the recirculated gases becomes excessive. However, even at these lower temperatures, calcining can be satisfactorily done at fuel consumptions of from 30 to 35 gal. of oil per ton of lime without the necessity of handling recirculated gases of excessive volumes and temperatures. (See Charts No. 2 and No. 3.)

As stated before, the waste heat which would normally pass out of the kiln in the exhaust gases is reclaimed by the down-firing used in this kiln. A typical set of conditions will be followed which will show the way in which the down-firing functions. Taking 2500 deg. F. as the calcining gas temperature and assuming that 20 percent of the total calcining gases are to be down-fired, we have as previously determined figures the basic heat requirement or oven output of 5,900,000 B.t.u.s per ton of lime burned and the weight of oven calcining gases of 8,960 lbs. In calcining one ton of lime, 1580 lbs. of CO_2 gas is released from the stone; adding this to the weight of oven gases gives 8960, plus 1580 or 10,540 lbs. of total kiln gases per ton of lime burned. The 20 percent of these kiln gases which are to be down-fired will be .20 times 10,540 or 2,108 lbs. These down-fired gases, after completing the calcining, leave the bottom of the calcining zone at 1650 deg. and contain

Weight $\times$ spent heat $\times$ temperature diff. (over 60 deg.) or 2108 $\times$ .256 $\times$ 1590 = 860,000 B.t.u.s per ton of lime.

These spent down-fired gases mix with the cooling air and both are recirculated to the oven and their heat re-used. The cooling air, in cooling the lime, absorbs 764,000 B.t.u.s per ton of lime. The mixture of cooling air and spent down-fired gases contains 764,000 B.t.u.s in the cooling air plus 860,000 B.t.u.s or a total of 1,624,000 B.t.u.s which is recirculated to the oven and furnishes that amount of the oven output requirement. The total oven output of 5,900,000 B.t.u.s per ton of lime less the 1,624,000 B.t.u.s furnished by recirculation leaves 4,276,000 B.t.u.s to be supplied by the fuel. This is equivalent to 4,276,000 $\div$ 150,000 or 28.6 gallons of oil per ton of lime burned.

At 2500 deg. F. the total oven output required is 8960 lbs. of gases. Of this amount the oil will furnish 28.6 gal. $\times$ 7.95 lbs. gal. or 224 lbs.

• Left, top: Chart 2; middle: Chart 3; bottom: Chart 4.

With most low-pressure atomizing oil burners, the temperature of the atomizing air must be not over 300 deg. F. In this case, this would call for approximately 15 percent of the total combustion air to be atmospheric air. This atmospheric air would furnish no heat to the oven but would contribute 15 percent $\times$ 28.6 gal. $\times$ 110 lbs. comb. air per gal. or 472 lbs. of the total oven output gas requirement. The oil and atmospheric air component of the atomizing air together furnish 224 + 472 or 696 lbs. of the oven output. The total output of 8,960 less 696 is 8,264 lbs., which must come from the recirculation circuit. The recirculation circuit will furnish the balance of the required combustion air to the burner, as well as the oven tempering gases. It should be noted that since the total recirculated gases contain only a small percentage of down-fired gases, the CO_2 content is not high enough to interfere with combustion. The 8,264 lbs. of recirculated gases contains the 1,624,000 B.t.u.s of waste heat. The temperature of these recirculated gases will be $\frac{\text{B.t.u.s contained}}{\text{sp. heat} \times \text{lbs.}}$

$$+ 60 = \frac{1{,}624{,}000}{.25 \times 8264} + 60 = 845$$

deg. F.

The No. 2 Ellernan calciner produces 12 tons of lime per 24 hours or .5 tons per hour. This equals .5 $\div$ 60 or .00833 tons per min. The recirculated gases of 8,264 lbs. per ton of lime will be 8,264 $\times$ .00833 or 68.8 lbs. per min. The volume of the recirculated gases at 845 deg. will be

$$\frac{\text{lbs. per min.} \times \text{abs. temp.}}{\text{ave. density} \times 492} = \frac{68.8 \times 1305}{.085 \times 492} = 2{,}150 \text{ cu. ft. per min.}$$

The weight of the main exhaust gases will be the weight of the oven output gases, 8,960, plus the CO_2 gas from a ton of lime, 1580 lbs., or a total of 10,540 lbs., less the pounds of gases down-fired or 10,540 lbs. minus 2180 lbs., which equals 8,432 pounds—the weight of the main exhaust gases. The main exhaust gases contain sufficient heat when leaving the calcining zone to do all of the preheating of stone, so the heat salvaged from the spent down-fired gases came from the basic heat of 1,452,000 B.t.u.s per ton which would have been in the main exhaust gases if no down-firing were done. With 20 percent down-firing, the waste heat in the main exhaust gases is 1,452,000 less the 860,000 B.t.u.s recirculated from the spent down-fired gases or 592,000 B.t.u.s per ton of lime. The 8,432 lbs. of main exhaust gases containing 592,000 B.t.u.s will be at a temperature of

$$\frac{592{,}000}{.256 \times 8432} + 60 = 335 \text{ deg. F.}$$

For the No. 2 calciner, the volume will be

$$\frac{.00833 \times 8432 \times 795}{.0855 \times 492} = 1320$$

cu. ft. per min.

With 2500 deg. oven gases and 20 percent down-firing, the heat balance is:

	BTUs per Ton of Lime
Calcining Heat	2,424,000
Preheating	1,724,000
Waste heat in exhaust gases	592,000
Radiation loss	300,000
	5,040,000
Less heat reclaimed from lime	764,000
Fuel required	4,284,000

BTUs or 28.6 gal. of oil.

Thus, by down-firing 20 percent of the calcining gases and recirculating waste heat, the fuel requirement at 2500 deg. oven temperature is reduced from 5,900,000 B.t.u.s to 4,284,000, or from 39.4 gal. to 28.6 gal. of oil per ton of lime. This represents a substantial saving and is accomplished without the necessity of handling excessively high temperature gases.

At any given oven temperature, as more and more waste heat is recirculated and re-used, the temperature of the recirculated gases increases, the exhaust gas temperature decreases and the fuel requirement decreases rapidly. This is clearly shown in Table No. 1, which lists conditions at various percentages of down-firing for 2500 deg. oven temperature.

The heat absorption within the calcining zone is very rapid when small-sized limestone is burned, and for this reason the actual temperature within the calcining zone is approximately 300 deg. less than the temperature of the calcining gases leaving the oven. The range of calcining gas temperatures covered in this article—from 2200 to 2600 deg. F.—covers from 1900 to 2300 deg. temperature range in the calcining zone proper, which is truly low-temperature calcination.

Charts No. 2 and No. 3 show the required recirculation temperatures and volumes for various oven temperatures and fuel requirements. Chart No. 4 shows the exhaust gas temperatures and volumes both undiluted and with 100 percent top hood leakage by weight.

A study of these charts clearly shows the remarkable fuel efficiencies that can be secured at low-temperature calcination, without the necessity of handling recirculation gases at excessive temperatures or volumes. This is due to the positive and continuous control of cooling air, down-fired gases and tempering of calcining gases. It is also due to the fact that the recirculation circuit furnishes practically all of the primary air, secondary air and tempering gases to the oven. This calls for a large volume of gases which are made up of down-fired gases, cooling air and excess air. The total recirculation circuit contains only a small percentage of intermixed high-temperature down-fired gases and the resultant temperature of recirculated gases is relatively low.

With low-temperature calcination there are some distinct benefits to be gained by completing the final calcination with down-firing. When a kiln is fired in the usual manner, the completely-calcined lime is at the zone in which the highest gas temperatures exist, and there is danger of overburning, whereas, with down-firing for the last stage of final calcination, the completely-calcined lime ends up in an atmosphere of gases only slightly over the lowest feasible calcining temperature. Since only a fraction of the total calcining gases is down-fired, the gas travel is quite slow through the lime when completing the calcination, and an opportunity exists for the heat in these slow moving gases to be effi-

(*Continued on page* 81)

Table No. 1
Fuel Requirements—Per Ton CA O
2500° Oven Temperature

Waste Heat Saved from:	Million B.t.u. per Ton	Recirc. Gas Temp. ° F.	Undiluted Exhaust Gas Temp. ° F.	Gal. Oil per Ton Lime
None—Basic heat requirement	5.9	....	780	39.4
Hot lime only	5.2	430	628	34.3
Lime and 10% Spent gases	4.7	620	500	31.5
Lime and 20% Spent gases	4.3	845	335	28.6
Lime and 30% Spent gases	3.9	1000	180	25.8
Lime and 33.8% Spent gases (optimum condition)	3.68	1110	60	24.5
Lime and 35.5% Spent gases Theoretical limit (no radiation losses)	3.28	1170	60	22.0

30th Annual N. L. A. Convention at Hot Springs—an Outstanding Event

another ON THE SPOT report

THE 30th annual convention of the National Lime Association and the 46th annual meeting of the lime industry, were held at The Homestead, Hot Springs, Va., April 5, 6, and 7, 1948. This was about a month earlier than the usual date

By W. E. TRAUFFER

for this meeting, and it followed rather closely the very successful meeting of the association's Operating Division in Cincinnati, January 29 and 30, (see PIT AND QUARRY, March, 1948). It was, nevertheless, one of the best meetings in the history of the association and brought out a record attendance of members and their wives. The program was well-balanced with outstanding papers on a variety of subjects of interest to producers.

The weather was slightly on the cool and damp side but not enough so to prevent any of the conventioneers from participating to some extent in their favorite outdoor sports.

Preceding the convention, on Sunday, April 4, the meetings of the board of directors and the executive committee were held. It was there decided that the Fall meeting of the board of directors would be held either at Hot Springs or at Virginia Beach, Va., on Sept. 29 and 30. It was also agreed that the 1949 and 1950 annual conventions should be held at The Homestead early in May as had been the custom. The board also agreed to maintain the foreign affiliate dues at $25.00 because of the dollar shortages in foreign countries and the restrictions imposed by those countries. The foreign membership has shown a gratifying increase since World War II.

NEW OFFICERS

H. D. Brigstocke was re-elected president and chairman of the board of directors. Also re-elected were the following: Robert S. Boynton, general manager and treasurer; Mrs. Roma M. Turpen, secretary; and Gladys L. McBee, assistant secretary. Mrs. Turpen was prevented by illness from being present at this meeting. Following are lists of the members of the executive committee and the board of directors for 1948-49.

EXECUTIVE COMMITTEE

H. D. Brigstocke (chairman) vice-president, Thomasville Stone & Lime Co., Thomasville, Pa.

K. L. Hammond, secretary-treasurer, Keystone Lime Works, Inc., Keystone, Ala.

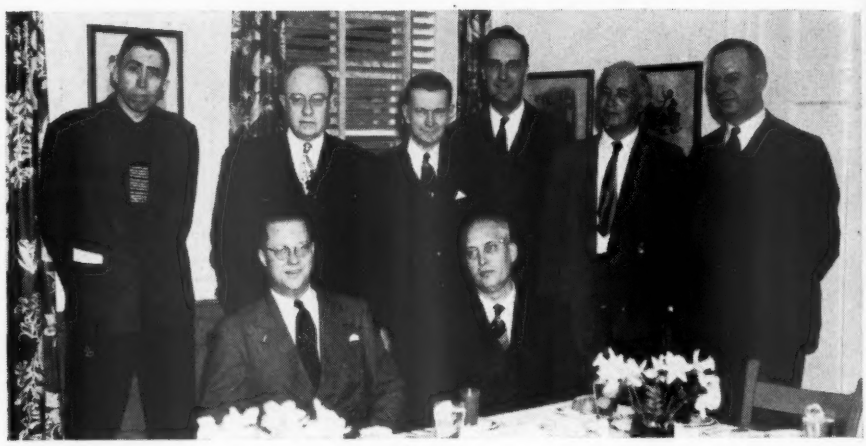
Wallace E. Wing, president, Marblehead Lime Co., Chicago, Ill.

Bolton L. Corson, vice-president, G. & W. H. Corson, Inc., Plymouth Meeting, Pa.

Amos B. Miner, manager industrial sales, National Gypsum Co., Buffalo, N. Y.

Reed C. Bye, vice-president, Warner Co., Philadelphia, Pa.

J. A. Dunaway, vice-president and general manager, Peery Lime Co., Inc., North Tazewell, Va.



• The new technical problems committee of the N. L. A. Left to right: seated, Robert S. Boynton, general manager, N. L. A.; Wallace E. Wing; standing: J. S. Offutt, R. S. Greeves, Prof. W. C. Voss, Dr. L. J. Minnick, C. C. Loomis, Prof. J. A. Murray

BOARD OF DIRECTORS

District 1. C. C. Loomis, New England Lime Co., Adams, Mass.

District 2. H. D. Brigstocke, Thomasville Stone & Lime Co.; E. D. Williams, H. E. Millard Lime & Stone Co., Annville, Pa.; B. L. Corson, G. & W. H. Corson, Inc.

District 3. A. B. Miner, National Gypsum Co.; Reed C. Bye, Warner Co.; F. J. Collins, Kelley Island Lime & Transport Co., Cleveland, O.

District 4. J. J. McInnis, Eagle Rock Lime Co., Eagle Rock, Va.

District 5A, Fred Witmer, Ohio Hydrate & Supply Co., Woodville, O.; W. W. Sprague, National Mortar & Supply Co., Pittsburgh, Pa.

District 5B. Russell Rarey, Marble Cliff Quarries Co., Columbus, O.

District 6. L. N. Carmouche, Dow Chemical Co., Ludington, Mich.

District 7. W. E. Wing, Marblehead Lime Co.

District 8. M. Brisch Jr., Rockwell Lime Co., Chicago, Ill.

District 9. Henry La Liberte, Cutler-Magner Co., Duluth, Minn.

Districts 10-11. K. L. Hammond, Keystone Lime Works, Inc.

District 12. Paul Sunderland, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.

District 13. G. E. Robinson, Austin White Lime Co., Austin, Tex.

District 14. P. H. McMillin, Roche Harbor Lime & Cement Co., Roche Harbor, Wash.

District 15. Kennedy Ellsworth, U. S. Lime Products Corp., Los Angeles, Calif.

Messrs. Collins, McInnis and Brisch are newly-elected members of the board; the others were all reelected.

OPENING SESSION

H. D. Brigstocke presided over the opening session, which was devoted to various association and business matters. He warned that, while the industry is now going along with the high level of business activity, there are increasing signs that trouble may lie ahead. The association was reported to be in excellent financial condition.

General Manager's Report In his annual report of the association's activities Robert S. Boynton, treasurer and general manager, discussed the work which has been done on percentage depletion with the aid of competent legal talent. The lime industry, he said, has a strong case to present. Mr. Boynton also briefly reviewed some of the publication work done during the year, including the technical bulletin for users of lime for water and industrial purposes. He also stated that the first of the series on industrial trade wastes is now nearly ready. In 1947 the association distributed thousands of releases and booklets on water and sewage which continue to be in great demand.

According to Mr. Boynton, the use of lime for soil stabilization in Texas was investigated. It is believed that

• A technical group, left to right: C. B. Cox, National Gypsum Co.; Irving Warner, Warner Co.; Prof. W. C. Voss, Massachusetts Institute of Technology; Dr. G. W. Volk, Ohio State University.

this will be an important future market for lime. In addition to the research to be done at Purdue University on this subject, he said, the A.R.B.A. has formed a lime-soil stabilization committee and others plan to do likewise. He also mentioned the good progress being made on other research and briefly discussed the expansion of the trade wage survey.

GENERAL SESSION

The general session which followed was presided over by Wallace E. Wing, president, Marblehead Lime Co., Chicago.

Legislation *Current Legislation and Court Decisions* was the subject of an address by Abram F. Myers, counsel, Washington, D. C. He first traced the history of labor legislation step by step from the Clayton Act of 1914, which first released labor unions from the restrictions of the Sherman Anti-Trust Law of 1890. In Mr. Myer's opinion, the 18th Amendment (repealing the Volstead Act) and the Taft-Hartley Law are the two greatest legal steps toward freedom ever made in this country.

The Atomic Age In *An Editor Looks at Europe and the World in the Atomic Age* Walter J. Murphy, editor of *Industrial and Engineering Chemistry*, Washington, gave impressions based on a recent trip through Europe. Morale in England, he said, went down from a peak at the end of the war to a low level in the middle of 1947, but is now on the way up again, largely due to the Marshall Plan. England, in his opinion, is no longer a world power, but in spite of many problems it is now again on the road to recovery. Even the present standard of living there, he said, is possible only because of our dollars. In France, he said, the chief war damage was to manufacturing plants rather than homes. In Italy the physical damage was severe but the people are working hard to recovery. The chief need there, said Mr. Murphy, is better understanding of the meaning of the word "democracy". Belgium suffered during the war but is prospering because its people went back to work immediately after the war ended. Holland also is doing well in spite of severe damage, but rigid controls are in force there. Switzerland he called an island in the heart of war. The Scandinavian countries, he said, are well on the way to recovery, but the fear of Communism is widespread. Germany was terribly damaged and cannot possibly recover without outside help. Morgenthau's early policy of revenge was a terrible mistake, but our present policy, in his opinion, is much better. Mr. Murphy believes that 20 years of occupation will be necessary to remove the poisonous seeds of Nazism deeply instilled in the German people and to insure against the inculcation of any other anti-social creeds.

In summation, Mr. Murphy said that the Europeans want our help only to get them started and are anxious to achieve again a condition of solvency and self sufficiency. It is all-important, he emphasized, that we administer the European Recovery Plan properly and that we let the people of these countries know exactly what our aims are. We must aid in the formation of a western European union for the elimination of trade barriers as the best possible insurance against future world upheavals. More than money, said Mr. Murphy, Europe needs competent technicians to aid in recovery and we must loan them such men as long as they are needed.

Instrumentation *Instrumentation at National Gypsum Company's New Virginia Plant* by C. B. Cox, electrical engineer of that plant, was a complete and detailed analysis of the system of controls at that outstanding new lime plant. The report went far beyond the information on that phase of this operation contained in any previous article, including the more general article published in the December, 1947, issue of PIT AND QUARRY.

"The outstanding characteristic of instruments," said Mr. Cox, "is that they yield tangible and practical dividends, determinable in dollars and cents, which dividends write off the original cost in a very few years, sometimes in a few weeks." Instruments, he said, are acquired as capital investment because they render some of the following services to industry: labor savings, fuel savings, increased production, better quality of product, elimination of "rejects", uniformity of product, the minimizing of reliance on human watchfulness, accident prevention. Instruments referred to in his article measure one or more of the following conditions: temperature, humidity, pressure (or vacuum), duration of timing (of operation or process), rate of speed (of mechanical parts), flow, liquid level, strength, light. Six of these conditions, according to Mr. Cox, are used to achieve control in the Kimballton plant.

In conclusion, Mr. Cox said that experience thus far seems to indicate not only a substantial saving from adequate instrumentation because of increased efficiency, fuel economy, etc., but also a definite improvement in quality of product. This paper was illustrated with slides and a very complete kiln control chart prepared by the Bailey Meter Co.

Research Laboratory In the absence of Fred C. Bond, technical director, Basic Industries Research, Allis-Chalmers Mfg. Co., a paper on *Modern Basic Industries Research Laboratory* was presented by W. H. Tock, of that company. A complete description was given of the equipment in this huge and complete laboratory, which is actually a combination of pilot plants capable of making operating-scale tests on almost any form or phase of nonmetallic mineral production. Considerable equipment has been added to this laboratory since it was completely described in the January, 1946, issue of PIT AND QUARRY, and thousands of tests have since been

• Bolton L. Corson, G. & W. H. Corson, Inc.; Wallace E. Wing, Marblehead Lime Co.; Prof. J. A. Murray, Massachusetts Institute of Technology.

made which have added much to the technology of these industries.

BUSINESS SESSION

The annual business session was presided over by H. D. Brigstocke, president of the association. Business matters discussed included the association's budget for the 1948-9 fiscal year, reports of committees, ratification of officers for the coming year, etc.

Safety Contest Wm. T. Harvey Jr., of the association staff, then announced the winners of the 1947 N.L.A. Safety Competition, as follows:

Group A1—Plants operating quarries totaling over 100,000 man-hours: National Gypsum Co., York, Pa.; J. E. Baker Co., Thomasville, Pa.

Group A2—Plants operating quarries and totaling less than 100,000 man-hours; Lawrence Portland Cement Co., Thomaston, Me.; Southern Lime & Stone Works, Linville, Va.

Group B—Plants operating underground mines; National Gypsum Co., Bellefonte, Pa.

Group C—Plants operating neither mine nor quarry: Nyotex Chemical Co., Houston, Tex.

TRADE-WASTE CONSTRUCTION SESSION

The session devoted to the discussion of the use of lime for the treatment of trade wastes and in construction was presided over by Russell Rarey, president of the Marble Cliff Quarries Co., Columbus, O.

Stream Pollution *Federal and State Stream Pollution Legislation* was the subject of a paper by C. E. Schwob, sanitary engineering director of the U. S. Public Health Service, Washington. He traced the relation between sanitation and disease and told of the gradual solution of most health problems since the service built its first laboratory in 1901. Pollution of streams and other bodies of water is now a major problem. A survey made in 1947 showed the need for 8 million dollars to combat this menace. Mr. Schwob outlined a plan for the network of controls necessary but said that teamwork between individual groups and local, state and national governments was needed in order to accomplish anything. He pointed out the need for interstate controls such as the Delaware River and Ohio River commissions, which are accomplishing excellent results.

Following his talk the General Electric Co. movie *Clean Streams* was shown, which showed in stark reality what pollution by cities and industries has done to some of our most beautiful streams, lakes and beaches and to the once-important oyster and fishing industries in some areas. This film is one of the most eloquent appeals which could possibly be made on the necessity for fighting a menace which threatens the health and prosperity of every one of us.

Water Treatment The paper on *Industrial Waste Treatment* by E. F. Eldridge, professor of sanitary engineering, Michigan State College, Lansing, was not presented because of an automobile accident on the way to the meeting.

Soil Stabilization An important new outlet for lime was pointed out by Chester McDowell, senior soils engineer, Texas Highway Dept., Austin, in *Lime-Soil Stabilization in Texas.* In predicting a rapid growth for the practice of lime-soil stabilization Mr. McDowell told of the early trials and experiments and of the methods of preparation of such bases which are still nearly perfect after 2½ years. So far this method has been used only for flexible road bases but much wider application is indicated. He also described the formulas which have been developed for nearly every type of soil in the state. Each, he said, requires its own formula, granular types requiring about 3 percent lime and others up to 5 or even 10 percent. Slides were shown to illustrate test results and equipment, road types and charts, and samples of bases were exhibited.

The market, he said, has great potentialities but much research

• J. S. Offutt, U. S. Gypsum Co., and John M. Dalglish, Vermont Associated Lime Institute, Inc.

must be done in the laboratory and in the field by producers and highway departments. Texas alone could use 100,000 tons of lime annually for this purpose if lower-cost lime could be provided, as it must compete with cement for this market. Only high-calcium lime has thus far been used but Mr. McDowell saw no reason why dolomitic lime would not do just as well. Actually, he said, most of the early tests were made with waste lime with a stone or gravel sub-base under the lime-soil and with a ½-in. double bituminous surface for protection against water and abrasion.

Stucco and Plaster *Bolstering Stucco, Plastering Industry* was the subject of a talk by Erwin M. Lurie, national director, National Foundation for Lathing and Plastering, Chicago. This organization, he said, was formed by unions to promote lathing and plastering, to conduct research, to maintain high standards of craftsmanship, and to promote public relations for these industries which are so important to the lime producers. He further stated that many new and untried products are being tested and that the organization is not connected in any way with any manufacturer or type of product. Another aim is to eliminate unnecessarily high costs by unions which might limit the market. The foundation, said Mr. Lurie, is working on a federal grant of $50,000 at Armour Institute of Technology.

Mr. Lurie mentioned the rapid replacement of wood by metal and gypsum lath and also the fact that plasters and stuccos once contained up to 90 percent lime instead of the 10 to 20 percent now commonly used. He said that research work is also being done on many of the new types of building materials appearing on the market and that lime can be used successfully on concrete blocks, wood, metal lath, gypsum

products, etc. An apprentice training program sponsored by these trades now has an all-time high enrollment of 5,000 but even more are desired. Many other angles are being pursued, such as the amendment of existing building codes, specifications, etc., and existing prejudices and handicaps are also being worked on.

RESEARCH SESSION

The annual research session was conducted genially and ably by Professor Walter C. Voss, head of the Dept. of Building Engineering and Construction, Massachusetts Institute of Technology. In opening this meeting he stressed the importance of honesty and courage in research and the fact that if any worthwhile results are to be obtained one must first go after the fundamentals. He pointed out the large potential market for good masonry mortar cements—some of these now on the market contain 50 percent raw limestone—and urged producers to print the analysis of their product on the bag to emphasize its quality.

Agricultural Dr. Garth W. Volk, chairman of the Department of Agronomy, Ohio State University, gave a report on the Agricultural Research Fellowship at the Ohio Agricultural Experiment Station. According to the speaker, the types of crops, soils and climate determine the need for and extent of use of liming materials. Ohio, he said, is between the "coarse" West and the "fine" East, and its problem is thereby complicated. In discussing the necessity for using the proper minerals to balance each soil and provide proper nutrition for crops Dr. Volk said that many questions are yet to be answered. It must be determined whether lime affects the activity of micro-organisms producing nitrogen in soils, what effect it has on potash, etc.

Dr. Volk then commented on the importance of working in cooperation with other states, each doing a different segment of the necessary work, as in this way more and better work can be done without duplication. In preserving our soils, he said, prevention of the loss of top soil is most important and maintenance of soil organic matter is next.

In comparing the various materials used for liming soils, Dr. Volk said that quick and hydrated limes will neutralize a soil overnight, while limestone over 30 mesh has no effect even after 1½ years. Limestone up to 60 mesh is just as effective as minus 100 mesh. The specific surface area of a liming material is a good general guide to its efficiency. Hardness and effect on solubility is now being investigated and other fundametals are being checked. Dr. Volk also exploded some previous theories on the application of liming materials when he said that tests have shown that it makes no difference at what time it is applied and that additional applications at 2 or 3 year intervals keep the soil up just as well as applications made at more frequent intervals.

Waste Treatment Dr. Willem Rudolfs, professor of the department of Water Supply and Sewage Disposal, Rutgers University, was not able to be present at this meeting to present his latest report on sewage and trade waste research.

Road Stabilization *Road Stabilization* was discussed from a national viewpoint by A. W. Johnson, field engineer, Highway Research Board, Washington. He said that three factors to be considered in connection with soil stabilization are: soil and its characteristics; climate and other natural conditions; volume and loading of traffic. Soils, he said, may vary from sandy or granular to clay with fine, flat particles. Some are easier to stabilize than others and some are improved while others deteriorate when wet or frozen. Bitumens, cement and lime give different degrees of stability and permanence and must be selected on their merits. Lime is the newest material in this field, said Mr. Johnson, and its use became possible only when the necessary information on it became available.

To further the use of lime for soil stabilization Mr. Johnson made the following three suggestions:

1. That the industry start an active sales campaign based on the merits of lime, with full recognition of the fact that it cannot be used everywhere and under all conditions.
2. That more experimental roads be built, although it would be some time before any helpful information would be available from them.
3. That the laboratory approach now being followed by the association is the best one, and that it should be followed by (2) above.

He also urged that promotional efforts first be made in areas where aggregates are scarce or where the supply of good aggregates is dwindling. The association-sponsored studies being made at Purdue University are, he said, determining which soils are suitable for lime stabilization; with the facts obtained much progress can be made.

Corrosion Control *The Control of Corrosion by the Use of Lime* by E. S. Hopkins, associate engineer, Bureau of Water Supply, Baltimore, was a discussion of a little-known function of lime in water treatment. He told of the experience in Baltimore where for the past 26 years an average of 1800 tons of lime has been used annually to neutralize the water, which is relatively soft. This neutralization causes the deposition of a thin coating of lime on the inside of a water pipe, protecting it from any corrosive action. Slides were shown to illustrate its action.

Fundamental Research James A. Murray, associate professor of materials, Massachusetts Institute of Technology, gave a report on the fundamental research on lime being done under a fellowship at that institution. He first gave a brief resume of the long-range program. The first step he stated, was getting or making the necessary equipment, which includes a platinum resistance furnace, a porosimeter, etc. He also described the thermal analyzer which should be in operation soon and said that with it they could then determine some of the effects of porosity on lime. He also described the methods being used to determine particles of sub-micron size. Mr. Murray again emphasized that this is a long-range program of fundamental research and that results at first will be slow in coming.

Heat Balance

(*From page 77*)

ciently utilized. This method of partial down-firing also considerably lengthens the calcining zone without increasing the main draft requirements, a distinct advantage, especially in calcining at low temperatures.

Eagle-Picher Lead Co. Opens Diatom Processing Plant

Eagle-Picher Lead Co., producer of mineral wool and chats in the Joplin, Mo., area, recently completed the erection of a new plant at Clark, Nev., 20 miles east of Reno, for the processing of diatomaceous earth.

Much of the output is a lightweight material produced by exfoliation for use as insulating fill, filtering media in the paint, paper and beverage industries, and other products.

Expansion AT MAPLE GROVE . . .

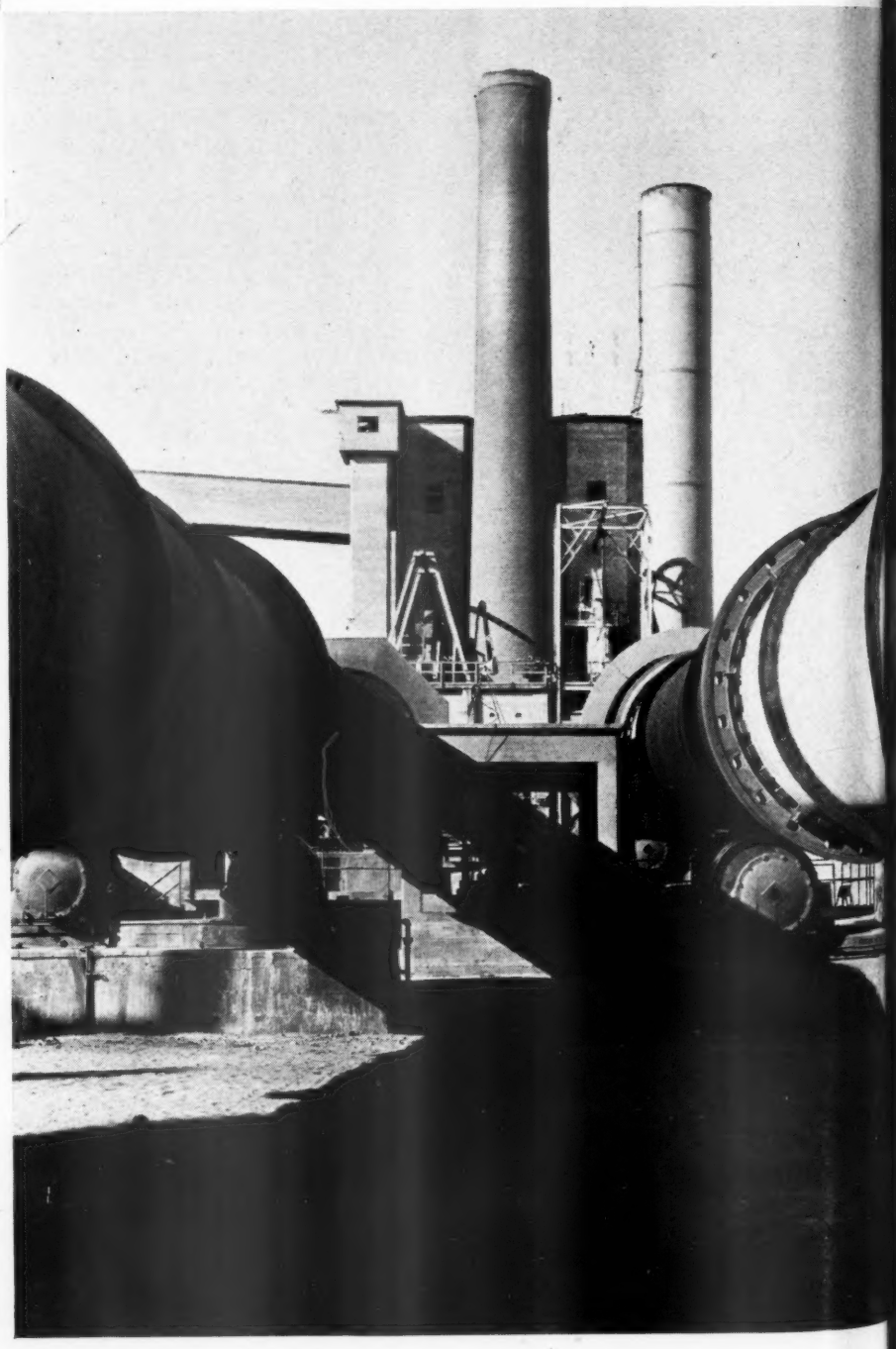
Basic Refractories' new kilns are world's largest for producing dead burned dolomite

By William M. Avery

another ON THE SPOT report

WITH the recent completion of an expansion and modernization program involving expenditures of $1,800,000, Basic Refractories' plant at Maple Grove, Ohio, has become by a comfortable margin the largest operation of its kind in the world. The program referred to actually reached completion with the starting up last September of the second of two new kilns which are said to be the world's largest for the production of burned dolomite. The first was placed in operation in 1943 in time to play an important role in Basic's contribution to the war effort. Actually, at the time the program was decided upon, three new kilns were envisioned, and the third is still definitely in prospect for some time in the future.

Some conception of the size and capacity of the new kilns is indicated by the fact that they are producing as much burned dolomite as all seven of the kilns operated prior to 1943. Among other advantages inherent in the operation of high-capacity kilns, the company is at last in a favorable position to abandon the operation of four over-age kilns at a smaller plant in nearby Betts-



• The two 328-ft. kilns at Maple Grove, which are said to be the largest in the world used for the production of burned dolomite. The kiln at the left, installed in 1943, is 10 ft. and 11¼ ft. in diameter; the recently-installed kiln at the right is 11¼ ft. in diameter for its entire length.

• Top: In this view, taken from the top of the kiln building, are (right to left) the crusher building at quarry level, the cantilever conveyor to the raw stockpile and the crushing and screening building.

• Bottom: A general view of the Maple Grove quarry, showing the 4-cu. yd. electric shovel and some of the 14-cu. yd. trucks. Note the smoothness of the quarry floor, which makes the construction of roadways unnecessary.

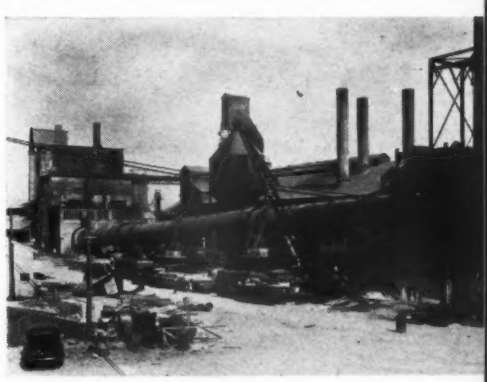
ville. When this has been accomplished the Maple Grove setup will include five kilns on dead burned dolomite production and two others used exclusively in the production of magnesia refractories.

As might be expected, this sharp increase in burning capacity required expansion or adjustment of all the company's facilities from the quarry on. Primarily to get more dolomite to the plant, but also in the interest of increasing efficiency, the first move in the quarry was to change from a third-rail haulage system to trucks. Six 14-ton Autocar diesel units were placed in operation in October, 1941, in time to provide the increase in quarry capacity necessary to supply the first of the two new kilns. This change, by eliminating tracks in the quarry, also made it possible to shoot the entire 60-ft. face a one time, instead of in 30-ft. benches as had been the practice.

The deposit at Maple Grove is known as the Guelph stage of the Niagaran formation, Devonian age, and the stone is about 99½ percent pure dolomite. This high purity, in addition to its uniformity, makes the dolomite an almost perfect material for chemical processes. The quarry was first operated in 1904, and at the present time about 145 acres have been worked, with the quarry floor held at about 60 ft. below the floor of the stone plant. On both this occasion and during an earlier visit to Maple Grove the quarry operation impressed us as being one of the cleanest in the country. The average overburden encountered is probably close to 3 ft.

More recently quarry efficiency at Maple Grove was further increased as a result of a blasting fluke which got the company interested in the posibilities of a delayed-action technique. Primary blasts had always produced a great deal of oversize material, and even under the best conditions 12 to 14 men were almost continuously engaged in secondary drilling. As a result of the miss-firing of one hole in a 10-hole primary blast, it was noted that much better breakage was produced in the area of the miss-fire than elsewhere. Extensive experiments carried out in conjunction with engineers of the Atlas Powder Co. resulted in the development of the Rockmaster* system of blasting. In addition to an 80 percent reduction in secondary shooting, the Rockmaster system in this quarry has affected an important increase in shovel efficiency.

In studying the overall needs of the expanded plant, it was decided to do the primary crushing in the quarry; and, to reduce plant dependency on current quarry operations, a surge pile system was also adopted. Of the 27,000 tons' total storage capacity enough to supply the mill for three shifts is live storage. Under normal conditions operations of the quarry and the mill are in almost perfect balance, with both departments operating 12 shifts per week, but the company has found



• A general view of a part of the burned dolomite plant, with the new kiln in the foreground in the final stage of construction.

*See *New System and Electrical Devices Improve Blasting Efficiency*, PIT AND QUARRY, Nov., 1945, p. 96.

it most advantageous to be able to run either without the other.

At the primary crushing station the trucks dump directly into an 84- by 60-in. Allis-Chalmers jaw crusher. A unique feature of this crusher installation is the direct-connection of the 250-hp. induction motor drive through a Falk Airflex coupling, in which the actual power transmission is effected by a pneumatic tire within the rim of the coupling. This provision protects the prime mover from impacts caused by the irregular torque characteristics of the crusher, damping out shock and vibration.

An overhead crane with a hood installed over the primary crusher enables the operator quickly to relieve jams and hang-ups. Secondary reduction is accomplished in a No. 18 McCully fine reduction gyratory crusher, which discharges the dolomite into a 36- by 48-in. Stephens-Adamson pivoted bucket carrier. The bucket carrier elevates the stone and discharges it onto the 36-in. stock-out belt conveyor. The conveyor is unlike any we have seen in that the load is shared by two drive pulleys, each being driven by a special characteristic 40-hp. Allis-Chalmers motor through a Horsburgh & Scott speed reducer. This dual drive is so effectively balanced that the motor loads normally vary only an amp or two.

In the dolomite sizing plant itself no major changes were required in connection with the expansion program. The dolomite is fed from the surge pile to the sizing plant on 30-in. reclaiming belt, and recrushed, washed and screened in preparation for the kilns.

The belt delivering from the storage pile to the sizing plant is fed by a mechanical feeder driven by a Reeves variable speed reducer, the speed of which is controlled from a panel board in the sizing plant. Also driven by this reducer is a tachometer which indicates on a volt meter on the same panel board the speed at which the feeder is running. This volt meter is calibrated in tons per hour being delivered. By this means the sizing plant operator can reset the delivery in a few seconds to any predetermined capacity known to be the maximum that can be handled under the conditions then prevailing in the sizing plant. A complete description of the quarry, the underground crushing station, the stockpile and the crushing and screening building was published in the June, 1944, issue of PIT AND QUARRY, pp. 62-65.

A 735-ft. long underground raw materials conveyor moves the sized, washed dolomite down to the burning department, where it is cross conveyed and elevated to the silos which supply the new kilns. Feed for the older kilns in the plant is also taken off at a point above the new silos and conveyed to other storage points.

Each of the new kilns has separate concrete storage silos and facilities for blending and feeding the raw materials. The main feed is designated as No. 6 stone, corresponding to ⅜-in. material. About 10 percent of the total feed is No. 7 (or fine) dolomite, and about 4 percent consists of mill scale, or flux. These materials are blended in the proper proportions by means of three Hardinge Feedometers in each kiln circuit. A fourth feeder is included in each circuit for recycling underburned material, which is trucked back from the discharge end of the kilns. The feeders are synchronized by means of an alternator, so that the rate of feed is automatically adjusted when the speed of the kilns is changed. The combined feed for each kiln is elevated to an alloy steel pipe through which the kiln is fed by gravity.

Both the new kilns are 328 ft. in length, and both measure 11 ft. 3 in. at the discharge end. In the earlier installation the diameter tapers down to 10 ft. at the feed end, whereas in the newer of the two it was thought that some increase in capacity would result if the 11-ft. 3-in. diameter were maintained throughout the length. Both kilns were supplied by Allis-Chalmers—the older a rivited job with double-roll bearings, the newer welded throughout and having single-roll bearings. Each has five supports and the 25-in.-wide tires are cut up hill so that the thrust bearings carry almost no load. Both are set on a pitch of 9/16 of an inch per foot. In the hot zones the kilns are lined with 9-in. burned magnesia-chrome brick manufactured by Basic Refractories. Six-in.-high alumina lining is used in front of and in back of the hot zones, and No. 1 firebrick in the colder parts of the kilns.

The kiln-drive motors are an Allis-Chalmers 150-hp. shunt-wound, and a Westinghouse 125-hp. type SK, both direct current. Each is backed up by an Allis-Chalmers gasoline engine, used for starting up and for stand-by in case of a power failure. Both drives are variable speed, permitting adjustment of the speed of the kilns between the limits of 20 and 66 r.p.m.

The No. 11 kiln (the one most recently placed in operation) is served by a 125-ft. steel stack which is 12 ft. 6 in. in diameter with an 8-in. lining of an insulating castable, Kast-O-Lite, made by A. P. Green Fire Brick Company. The brick stack serving No. 10 kiln is 10 ft. in diameter and 150 ft. high. Each stack is equipped with a louvre-type damper, controlled by motor drives from the burning floor, so that the draft can be quickly adjusted.

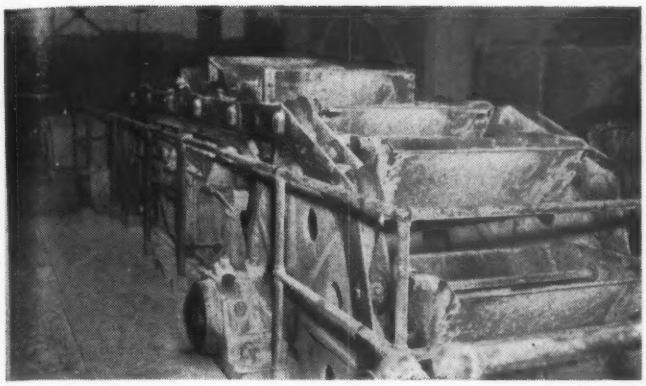
The No. 10 kiln is equipped with a Fuller Cooler which acts as both a primary and secondary cooler, whereas the No. 11 kiln is equipped with a Vanderwerp Recuperator acting as a primary cooler in connection with a Fuller cooler which serves only as a secondary cooler.

About 65 percent of the air consumed in combustion is supplied to the kiln through the cooler, 30 percent by the fan on the Raymond Bowl mills which supply pulverized coal for firing; about 5 percent comes from leakage around the firing hoods. Air used for secondary cooling is vented to atmosphere.

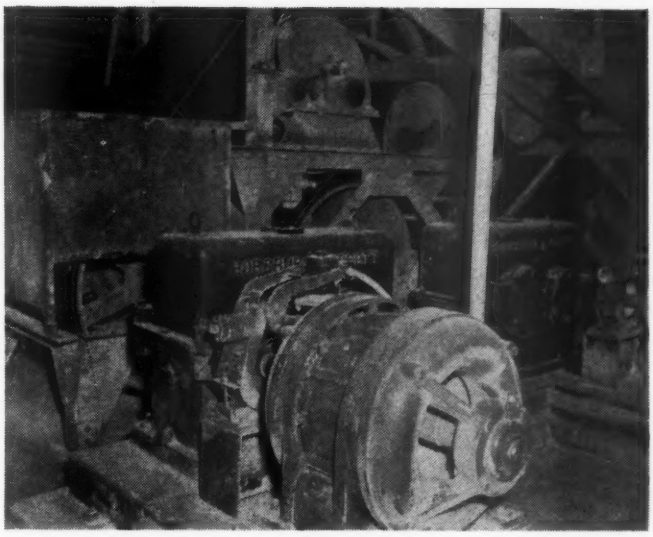
The No. 10 kiln has a B&W rolled alloy steel end in place of the conventional end castings, as the granules discharged to the Fuller cooler from this kiln are at a temperature close to 2,500 deg. F. In the recuperator-equipped kiln granules are delivered to the Fuller cooler at 800 to 1,000 deg. F.

Both kilns are operated at a temperature of approximately 3,000 deg. F., and both are fired with pulverized coal. As they pass counter-current to the flow of hot gases in the kilns the dolomite granules are calcined in the moderately hot portions to calcium oxide and magnesium oxide. Most of the iron oxide in the flux combines with lime to form dicalcium ferrite, which melts in the high temperature zone and acts as a mineralizer, shrinking the porous calcined granules and causing the small crystals of calcium oxide and magnesia oxide to grow considerably. In the dead burning process the dolomite granules lose approximately 60 percent of their volume, giving the final product a porosity of about 10 percent.

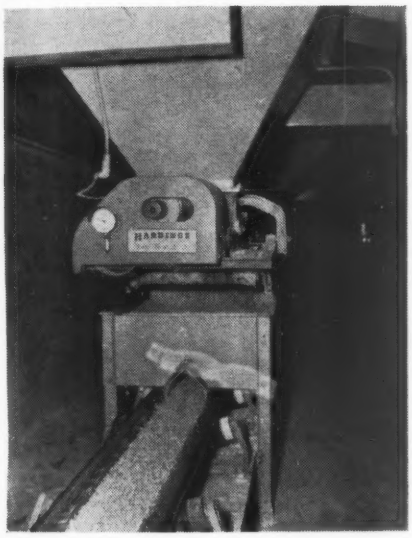
After cooling, the granules are oil treated to supplement the sealing effect of the calcium ferrite film, to retard slaking, and to impart sales appeal to the finished product. A heavy oil is used for this purpose. A final sizing operation is performed on vibrating screens arranged in closed circuit with a Symons cone crusher, in which the small percentage of oversize granules is reduced to minus ⅜-in. The two finished products silos (one for each kiln) are 24 ft. in diameter and 60 ft. high, and each is divided into 4 segments, so that any portion of the output of



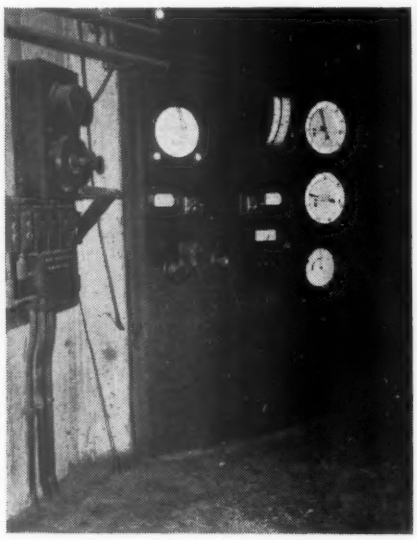
• A pivoted bucket carrier elevates and conveys stone from the secondary crusher to the stock-out conveyor.



• Right: An unusual drive pulley set up on the stock-out conveyor divides the load between two special-characteristic motors. Load sharing is effective within 1 or 2 amps.



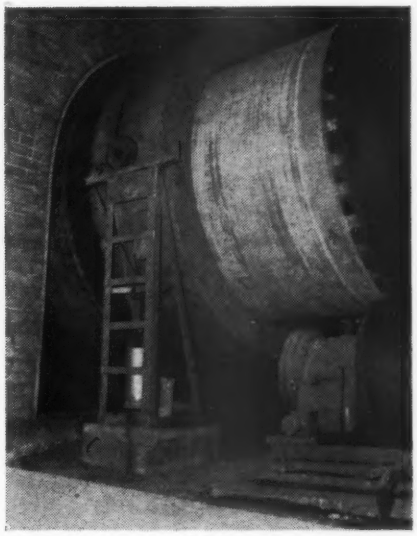
• Constant-weight feeders draw from overhead storage bins various materials which make up the kiln feed. The 4 feeders in each circuit are synchronized with the kiln which they supply.



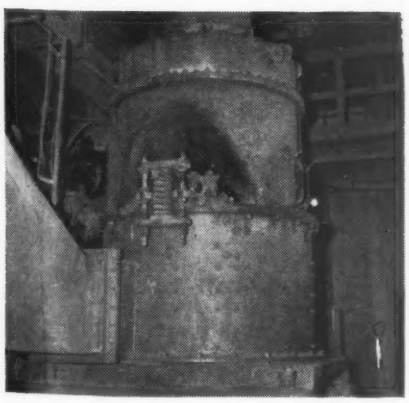
• The control panels are conveniently located within a few steps from the discharge end of the kilns.

• Left, below: Each kiln firing circuit has a grinding mill for pulverizing the coal used in firing. About 30 per cent of the combustion air comes from the mills.

• Right: One of the cone crushers used for reducing oversize clinker.



• On the No. 11 kiln 60 percent of the combustion air comes from the heat recuperator. The recuperator simultaneously cools the clinker and preheats the combustion air.



either kiln can be readily segregated and identified. Hardinge feeders located under the silos feed the finished product onto an 18-in. belt conveyor that discharges into the 5-ton batch scale in which outgoing shipments are weighed. Shipments are made in box cars, covered hoppers, or container cars. Dead burned dolomite finds its primary use in the steel industry as a low-cost refractory for replenishing eroded portions of the hearths of open hearth and electric furnaces.

The entire engineering for all of Basic Refractories' plants has been laid out by the company's engineering department.

A typical chemical analysis of their dead burned dolomite product, Magnefer, would show the following composition: CaO—53.3 percent, MgO—37.8 percent, Fe_2O_3—7.5 percent, SiO_2—0.8 percent, Al_2O_3—0.4 percent, and S—0.02 percent. Typical physical properties of the material are as follows: size of grains, 3/8 in. plus 20-mesh; bulk density, 115 lbs. per cu. ft.; total porosity of granules, 10 percent; true specific gravity, 3.51. The product has a much higher resistance to slaking than has calcined dolomite; this is due to the protective calcium ferrite coating, the low porosity of the granules and the relatively large size of the calcium and magnesium oxide crystals.

Basic Refractories' main production consists of two similar dead burned dolomite products marketed under the trade names "Magnefer"

(*Continued on page* 100)

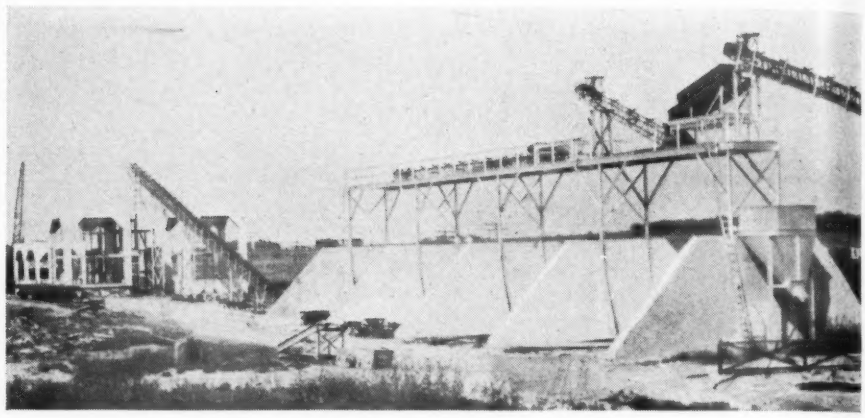
A New Lime and Limestone Plant for The Lone Star State

By W. R. CLIFFE
Consulting Engineer, L.I.M.E.

another ON THE SPOT report

IN the years just prior to the beginning of World War II correspondence was initiated between J. Lambert Lain of Cleburne, Tex., and L.I.M.E. consulting engineers, Hershey, Pa., relative to the possibilities of a limestone deposit near Cleburne. Mr. Lain, a prominent Johnson County businessman, recognized the possibilities of the deposit if it should turn out to be of sufficiently high quality. Its strategic location within 35 miles of Fort Worth, 45 miles of Dallas, and 70 miles of Waco, in his opinion justified thorough investigation.

At Mr. Lain's request a representative of L.I.M.E. went to Texas to examine the deposit, and as a result of his findings Limestone Products Company, Cleburne, Tex., was organized for the exploitation of the deposit. This spring the company's new plant (Fig. 1) goes into operation.



• Fig. 1. The new plant of the Limestone Products Company at Cleburne, Tex., shown under construction.

• Fig. 2. Left: A dump-truck unloads material into the primary crusher, which is powered by a diesel engine at left.
• Fig. 3. Below: The inclined belt (with shuttle conveyor) which distributes the limestone to open storage piles.

In a comparatively flat section of the cow country a veritable monument of limestone rises above the level of the surrounding area in an unusual formation. Having a perfectly flat top with an area of more than 50 acres, the entire body is stratified horizontally. The virgin rock is everywhere exposed and there is no overburden to be removed.

Core taken during the preliminary investigation proved to have the following analyses:

Calcium carbonate	98.10 percent
Magnesium carbonate	1.10 percent
Iron and alumina	.31 percent
Insoluble in acid	.42 percent

In addition to high quality stone the prospective owners were extremely fortunate in the existence of a spring, with ample flow to supply all plant needs, at the top of the stone deposit.

Following the positive findings of the preliminary investigation and the formation of the company, plans for the operation were begun. By the time these had begun to take definite form the country was at war and, with Texas sending every available man to the armed services or essential industry, it was necessary to hold everything in abeyance for the duration of hostilities.

With the return of peace the project was actively resumed and the quarry has now been developed to such a point that it can meet any demands placed upon it.

Quarry Plant Drilling is accomplished by means of a portable wagon drill and a portable air compressor. Holes are drilled on 7-ft. centers and bottomed out at 24 feet. Excellent fragmentation is obtained with the use of 1½-in. ammonia-base dynamite, and very little secondary blasting is necessary. A 1-cu. yd. diesel-powered shovel loads the rock on trucks. At present the haul is so short that one haulage unit keeps the plant adequately supplied. As the quarry face is pushed back and demand increases, additional trucks will be placed in service.

The primary crusher (Fig. 2) is powered directly by a Caterpillar diesel unit, which also drives a generator supplying power to all conveyors except for the reclaiming unit. From the crusher an inclined belt followed by a shuttle conveyor provides for the distribution of crusher-run limestone in open storage piles having a capacity of sev-

eral thousand tons. (See Fig. 3.)

Under the storage piles a concrete tunnel with carefully designed chutes houses the reclaiming belt conveyor. With current for only one 5-hp. motor available from the Rural Electrification Administration lines, it was decided to use this power for the reclaiming belt. As a result, power for the belt is always available and the installation of remote push-button control enables truck operators to withdraw stone from storage at will, even when the diesel generator is not operating. Loaded trucks transport the stone to the processing plant at Cleburne some 16 miles distant from the quarry site.

The feeder, primary crusher, and all conveyors at the quarry site are of Pioneer design and were supplied by Conley Lott Nichols Machinery Company of Dallas. Fig. 4 shows a flow diagram of the quarry facilities.

All construction at the quarry site is permanent in character. Reinforcd concrete and steel has been used throughout. A one-mile strip of road 30 feet in width connects the plant with the main highway. This road is excellently graded. The careful planning and construction is typified by the photograph (Fig. 5) of a typical culvert which provides not only for water runoff but for protection against intrusion by cattle from the open range around the plant.

The facilities at the quarry site are designed to supply the ultimate requirements of the Cleburne plant in a 40-hour work week. Quarry operation is handled by ten men including the foreman.

Intra-plant Transportation Haulage of minus 6-in. crusher-run rock from quarry storage to the processing plant located two miles south of Cleburne is performed on a contract basis.

In 1947 the state highway department constructed seven miles of 30-ft. road complete with bridges to connect the quarry site with a principal thoroughfare—ample evidence of the appreciation with which the new development is regarded by the state of Texas.

Processing Plant Selection of a suitable site for the processing plant was a matter for careful consideration. An excellent location was finally chosen. The area selected is level and well drained and located on the Santa Fe Railroad, lies between two main highways, and is close enough to Cleburne for convenience. The problem of transportation of both raw material and finished products, always a most important consideration, is thus simplified.

Loaded trucks from the quarry are not regularly weighed. Average weights satisfactory to all concerned are used in determining the contract charges for haulage.

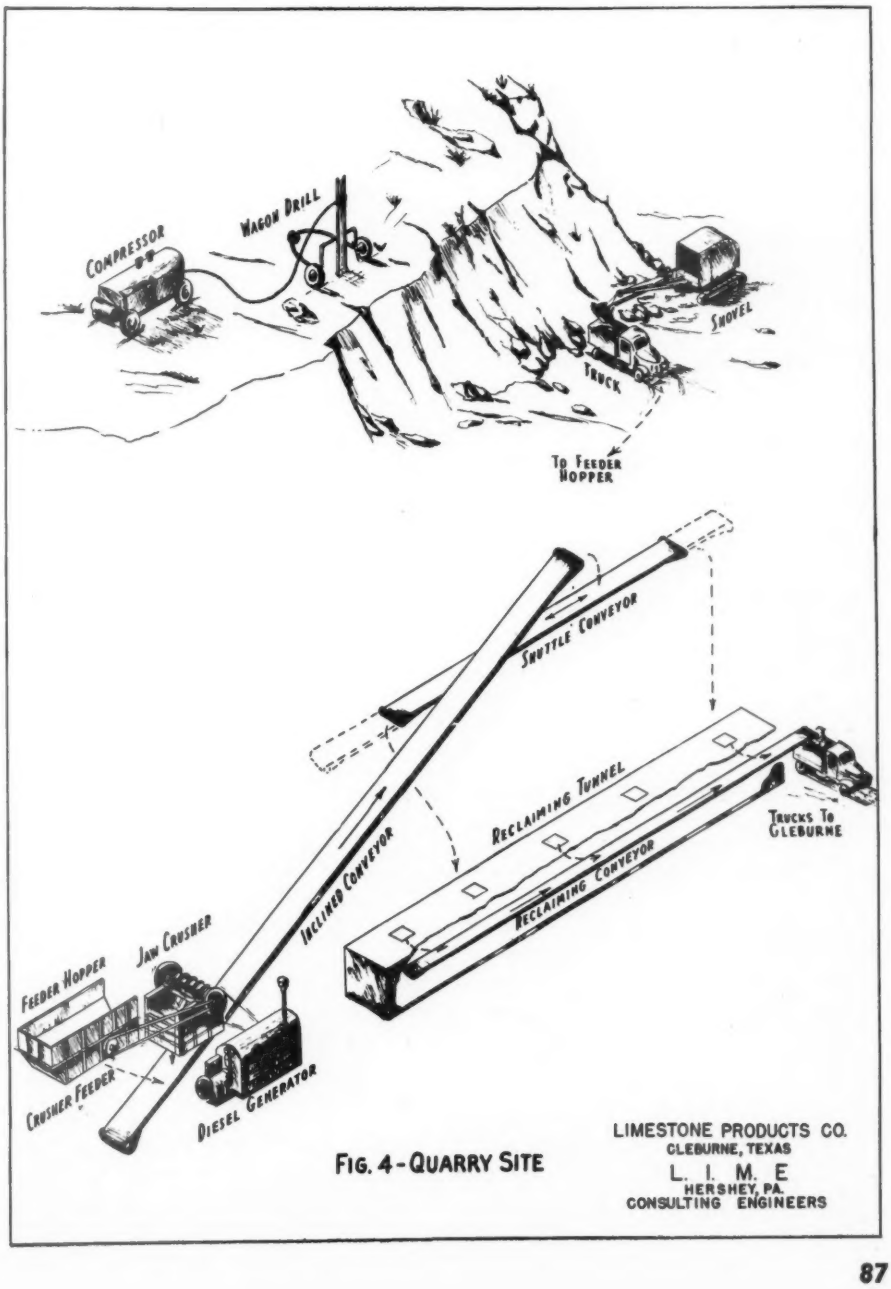
Trucks dump with a minimum of delay into an ample receiving hopper. By way of an integral feeder the stone passes to a double-roll secondary crusher where it is reduced to minus 1½ in. Oversize is returned to the receiving hopper by a truck which loads from a surge bin near the screen.

The run of the secondary crusher is screened and stored in the follow-lowing four sizes: minus ⅛ in., ⅛ in. to ⅜ in., ⅜ in. to ¾ in., and ¾ in. to 1½ in. The minus ⅛-in. size is processed to glass stone, while the remaining three sizes are fed to the lime producers.

Original plans called for the storage of sized stone in four open storage areas having a capacity of 1000 tons each. Because of the owners' insistence it is now planned to cover the storage area and the screen monitor and maintain them under a slight negative pressure in order to insure dust control.

Beneath the classified storage a long, well-lighted and well-ventilated tunnel houses the reclaiming belt. Bin gates of the same design as those at the quarry site have been installed to control the flow of stone to the belt. An inclined conveyor moves the stone forward to the plant proper, where a shuttle conveyor with tripper distributes the lime producer feed and where the minus ⅛-in. stone is discharged to the stone processing plant.

Fig. 4



All of the units from the double roll secondary crusher to the shuttle conveyor above the lime producers were furnished by Pioneer through the Conley Lot Nichols Machinery Co. of Dallas.

Figure 1 shows the facilities described above during the construction period.

The Leco lime producers, each having a daily capacity of ten tons, are fired by natural gas. These units, the first of their kind to be installed in the United States, were furnished by the Lime Equipment Co. of Lebanon, Pa. A feed bin with capacity in excess of a day's supply of raw stone is mounted above each unit. The stone moves successively through preheating, calcining, seasoning and cooling zones until it is discharged from the producer by a continuous withdrawal mechanism of reciprocating type. Absolute control of the withdrawal rate is provided by a variable-speed drive which actuates the pusher bar of the discharge mechanism.

Maximum fuel efficiency is obtained by the use of induced draft, unit being provided with an exhaust fan developing in excess of 20 inches w.g.

A minimum of steel provides support for the linings as well as for the burner platform, service platforms, stairways, and other equipment. The crowns are lined with H-W Castable, the calcining zone with H-W Allusite, and the balance of the unit with high-heat duty or wear-resisting brick, according to the conditions encountered.

Dust collection is accomplished by means of a small Buell cyclone collector on each producer.

An area 18-feet square suffices for the installation of a complete unit. Provision has been made for plant expansion to include ten units in addition to those now in place. The design of the layout is such that the ultimate lime calcining operation can be supervised by a single operator. Reference to Figure 6 will give an idea of the size of the two lime producers presently installed.

The quick lime is screened to four sizes by a Tyler screen and stored in a 2-ft. by 24-ft. quadrated steel silo beneath the screen. Arrangements are provided for motor truck and railroad car loading in bulk or bags. Facilities are provided for the production of pebble, ground, and pulverized lime.

Lime from the quadrated silo is fed by means of screw conveyor to a Jeffrey-Type A hammer mill, where it is reduced to minus ⅛-in. elevated and discharged to a small surge bin, whence it is continuously fed to the hydrator by a Hardinge volumetric feeder. High-low level indicators in the surge bin control the operation of the screw feeder preceding the hammer mill.

The hydrator is a Leco Model 6B, having a capacity of six tons of hydrate per hour. The six-cylinder hydrator is preceded by a pugmill with independent drive, a new feature in lime hydration. The hydrator was furnished, complete with platforms, railings, ladders, and all other accessories, ready for installation as an operating unit. From the hydrator a screw conveyor carries the crude hydrate to a Raymond No. 1 automatic pulverizer with double whizzer separator.

The entire hydrate plant, including Link-Belt screw conveyors and elevator, Jeffrey hammer mill, Hardinge feeder, Leco hydrator, and Raymond finishing equipment, was furnished by the Lime Equipment Co.

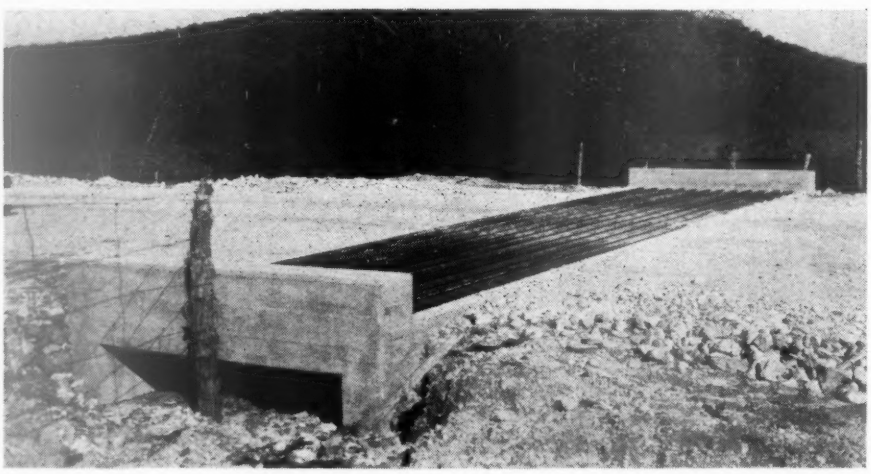
First quality hydrate is stored in a 16-ft. by 20-ft. steel silo. The tailings from the Raymond pulverizer are conveyed to a Kennedy-Van Saun 4½-ft. tube mill, where they are processed for agricultural and masons' hydrate and stored in another silo of similar capacity.

Norblo dust collectors are installed at all points in the processing plants where excess air is vented.

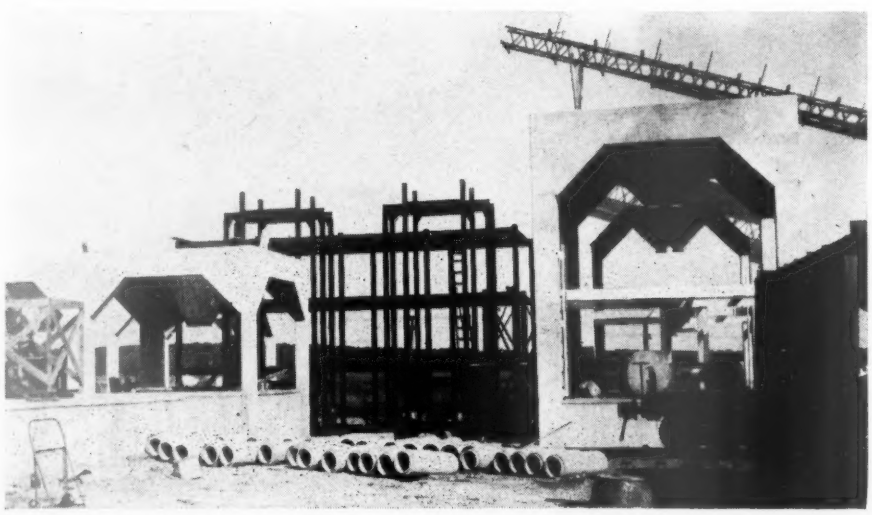
All lime packages are marketed under the trade name "Cleburnt", thus giving due recognition to the town from which the products of the plant will be distributed.

On the stone side of the operation a quadrated 20- by 24-ft. steel silo provides separate storage for four sizes of raw limestone which are separated by means of a Tyler screen mounted above the silo. A Jeffrey hammer mill is provided for the reduction of stone to suitable sizes if necessary or it may be bypassed when such reduction is unnecessary. Limestone from the silo may be bagged, bulk-loaded, or fed to a 4- by 6-ft. Kennedy Van Saun tube mill and pulverized for agricultural use. Provision is made for alternate use of this tube mill in the production of pulverized quick lime. Storage for agricultural limestone

(*Continued on page* 102)



• Fig. 5. A typical culvert which serves for drainage and is also a means of protection against cattle on the loose.



• Fig. 6. This view of the lime producers while under construction shows their impressive size.

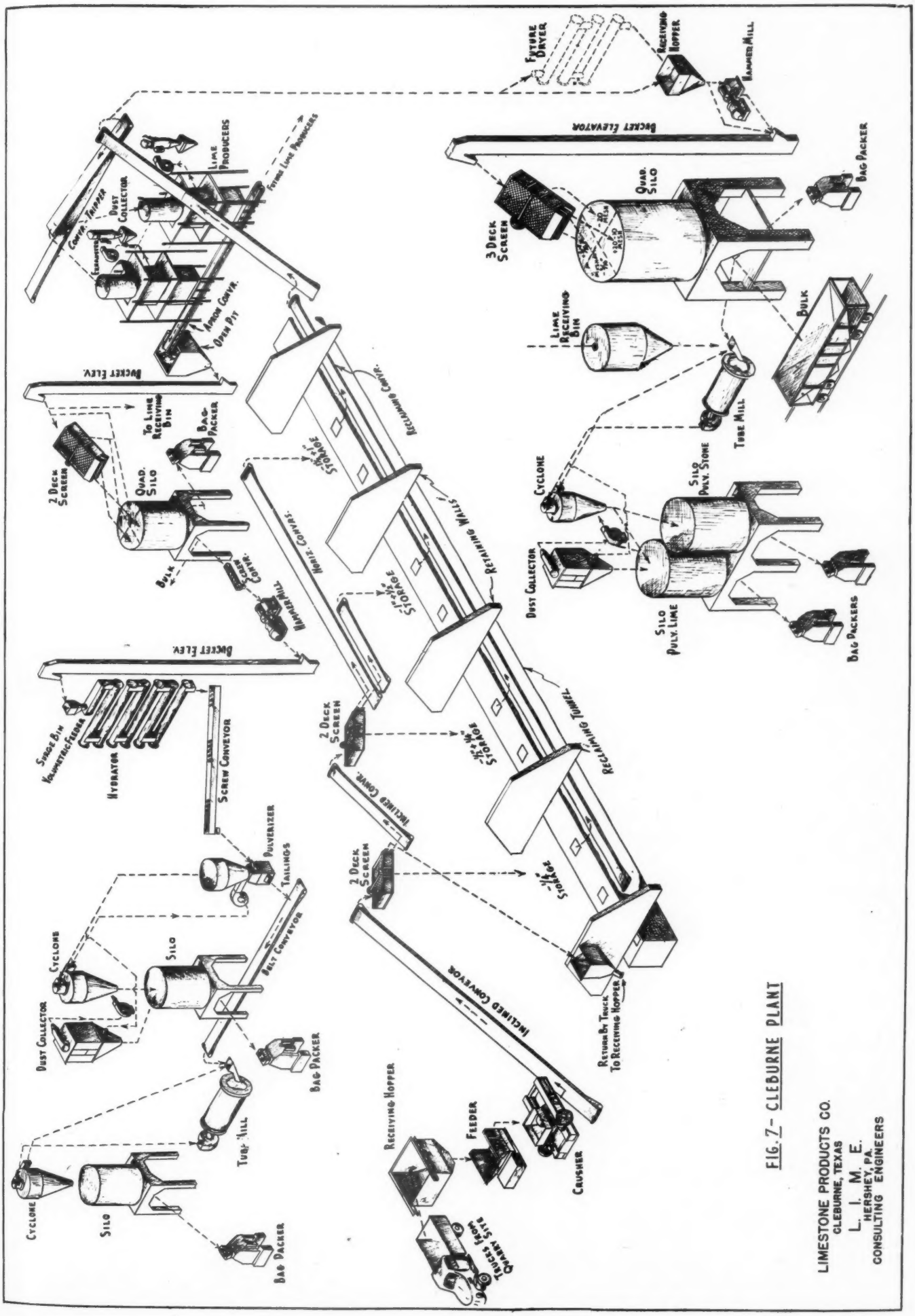


FIG. 7- CLEBURNE PLANT

LIMESTONE PRODUCTS CO.
CLEBURNE, TEXAS
L. I. M. E.
HERSHEY, PA.
CONSULTING ENGINEERS

New Kiln and Hydrating Gives Latin-America

• Ing. Santiago Soto, Kennedy-Van Saun Mfg. and Eng. Corp., and Don Juan Echeverria, president of Beneficiadora de Cal, S.A.

another P&Q exclusive

THE inauguration of the rotary lime kiln and hydrating plant of Beneficiadora de Cal, S. A., at Calera, Hidalgo, about 60 kms. north of Mexico City, will be in reality a new step in the industrial development of the country, and we might say, of Latin America. Up to this time most of the industries in Mexico and Latin America have been established with second-hand machinery, discards from other more industrialized countries, and even turn-overs from the countries themselves.

When this plant is inaugurated, it will not be "almost as good, or modern as any plant in the states or elsewhere," but it can be said that Mexico will have one of the most modern plants in the world for the production of lime, and hydrated lime. On this basis, Mexico is taking a position of "firsts," and not second bests in the world, and it is expected that, following this line of conduct, the Latin American countries will come to the foreground industrially.

HISTORY

Pedro and Juan Echeverría, the former, general manager and the latter, production manager and plant superintendent, in March 1939 took over the gypsum plant of Santa Julia, S. A., and initiated their operations in the gypsum and limestone industries.

At various dates in subsequent years, this group organized also the following companies: Yeso "El Tigre," S. de R. L. de C. V.; Cal Hidratada, S. de R. L. de C. V.; and finally the new company, Beneficiadora de Cal, S. A.

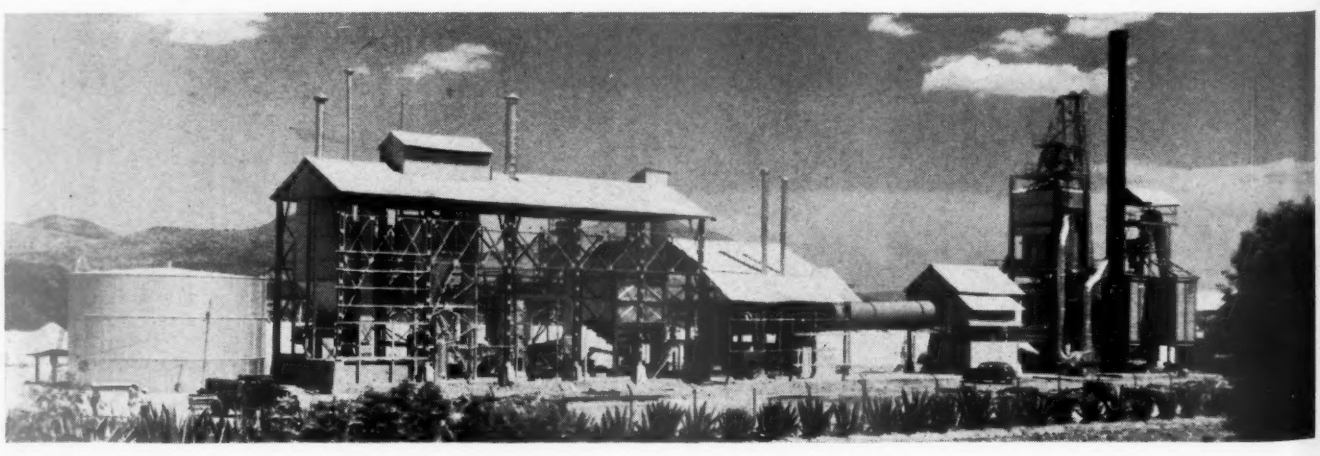
The success achieved in their operations culminated in the organization of Beneficiadora de Cal, S. A., with a capital of one-and-a-half million pesos. In the new company, Don Juan Echeverria is president, and Don Pedro Echeverria is general manager, and the company will inaugurate in May their modern rotary kiln, lime plant, and hydrating plant in Calera, State of Hidalgo, Mexico. This plant will have a capacity of 10 to 125 tons of lime, or approximately 165 tons of hydrated lime in 24 hours.

The gypsum plant taken over at Santa Julia, as well as their small lime and hydrating plant at Tlalnepantla, and afterwards their gypsum plant in Tlapizahuahua, State of Mexico (24 kms. on the Mexico City-Pueblo road), represent gigantic efforts in ingenuity, perseverance, and mechanical ability on the part of Don Juan Echeverría. In shops, hardly worthy of the name, and with equipment put together from pieces of junk, these companies produced the results that are now bringing about the inauguration of the plant described in this article.

The experience obtained in the plants mentioned gave Don Juan Echeverria the background to enable him to set up, almost by himself, the present modern installation. Of course, due credit is also coming

• Left: The offices, garage, staff house and recreation room of Beneficiadora.

• Below: A general view of the plant, including the fuel storage bin.



Plant at Beneficiadora A-1 Industry

By ING. SANTIAGO SOTO, E.M.
Kennedy-Van Saun Mfg. and Eng. Corp.

to Don Pedro Echeverría, whose administrative and financial ability made the new enterprise possible.

In the summer of 1945 requests for quotations on a rotary kiln and hydrating plant were placed with the Kennedy-Van Saun Mfg. & Eng. Corp., of New York, as well as with other firms.

In September, 1945, a contract was finally signed with Kennedy-Van Saun for a complete rotary kiln and hydrating plant of the capacity already mentioned, including 100 percent of the equipment, i.e., bins, motors, switches, ladderways, ladders, air ducts, etc. At that time the total value of the order amounted to nearly $250,000 (one million and a quarter pesos), and the installation complete and operating, will represent a total investment of slightly over two million pesos (approximately $400,000), including purchase price of the quarry, plant site, railroad spur, equipment, duties and freight charges, construction, etc.

By December of 1946 practically 90 percent of the equipment had been delivered at the plant site, where construction and erection were started in February of 1947. At the time of the writing of this article, the plant is 99.9 percent up, Kennedy-Van Saun Mfg. & Eng. Corp. will also furnish an expert for a period of ten weeks to initiate operations.

THE NEW PLANT

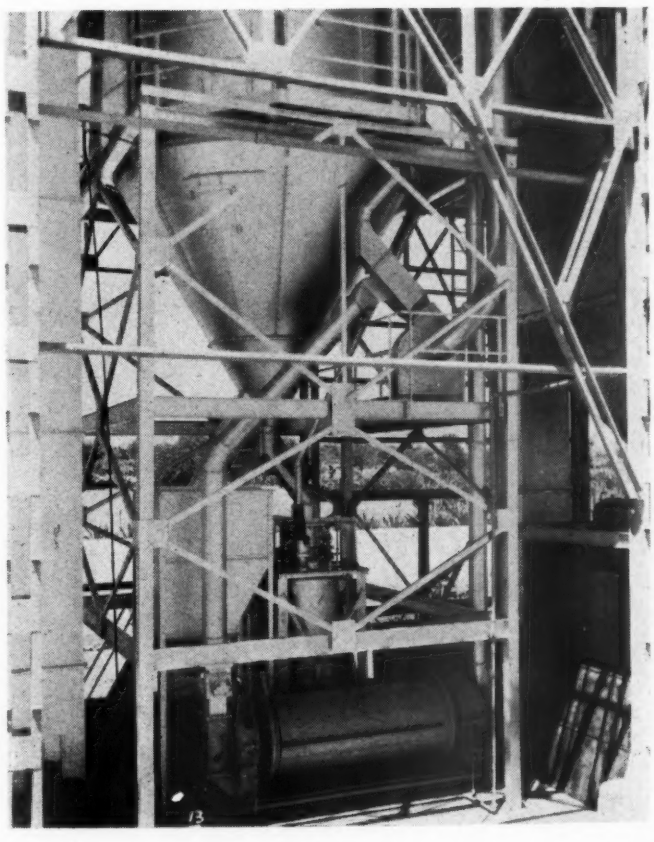
Crushing When operations are initiated, the limestone will be transported from the quarry, approximately 1½ km. from the plant, in 15- to 20-ton trucks. This differs greatly from the breaking of limestone for vertical kilns, where the material has to be carefully selected from 5 and 6 to 8 inches, discarding quarry fines: at Beneficiadora the stone can be loaded from the quarry on the trucks with mechanical shovels, fines and all, representing a considerable economy in quarrying costs.

The stone from the quarry will be dumped into a hopper over a No. 17 Kennedy-Van Saun gearless gratory crusher, equipped with 75-hp., synchronous motor. This crusher has two 17- by 58-in. openings, which is an ample size to take the rock from the quarry with only a small amount of sledge-hammer work.

The crusher is equipped with an automatic lubrication system in which is incorporated a pressure switch which is connected to an industrial-type howler so as to sound an audible alarm in the event the pressure in the oil circulating system of the crusher falls below a predetermined pressure. This lubrication system is similar to other recent installations of Kennedy crushers.

By means of a Kennedy bucket elevator the products from the crusher will be delivered to a 4- by 8-ft., two-deck K.V.S. vibrating screen. The upper screen has 1½-in. openings, and the oversize will be returned to the crusher; the lower screen has ½-in. openings, and the fines will go to a separate bin from which they will subsequently be taken to be ground down for making agricultural lime. The product for the kiln will therefore range from ½ to 1½ inches.

The crushed limestone is stored in separated sizes, the bins being built of lumber and steel. From the storage bins the material discharges through bin gates onto an 18-in. by 20-ft. Kennedy horizontal belt conveyor which, in turn, discharges into a receiving hopper ahead of the Webster balanced-type automatic skip hoist. This hoist has a capacity of 45 t.p.h., being equipped with a



• Left: The preheater, skip hoist, chimney, crushed lime bin, shaking screen and bucket elevator from the crusher.
• Right: A closeup of the air separator, the pneumatic pump and the ball mill.

60-cu. ft. skip bucket, a Falk gear reducer and a Westinghouse 15-hp. electric motor. The speed of the skip hoist is about 80 f.p.m.

Rotary Kiln The automatic skip discharges the raw stone into a 10-ton-capacity structural steel bin through a surge hopper fitted with an air seal.

The Kennedy preheater is, as shown in the drawing and accompanying photographs, a rectangular, fire-brick-lined receptacle with plunger feeder at the bottom; transversely the preheater has heat-resistant alloy steel elements which make for the uniform lowering of the limestone in beds, with the hot gases from the kiln going up counter-current through these beds.

When the limestone leaves the preheater to enter the kiln, it has been heated by the waste gases of the kiln to a temperature of 1200 deg. F. This installation is expected to give a fuel consumption that will average about 5½ million B.t.u.s per ton of burned lime. Actual performance has shown a heat requirement as low as 5 million B.t.u.s per ton.

The waste heat gases are conveyed by means of an exhauster. The dust collectors, ducts, draft controls, draft gauges, and steel chimney were also furnished by Kennedy Van Saun. The Leeds & Northrup CO_2 register is connected to the kiln dust chamber.

The 7- and 6- by 125-ft. rotary kiln shell is of all-welded construction with corresponding air seals, two forged steel riding rings, and two sets of carrying rollers. The driving mechanism adjacent to the upper tire comprises a main gear and pinion direct-connected to a totally-enclosed herringbone gear reducer to which is direct coupled a 4-speed motor. Also connected to the gear reducer is an emergency gasoline engine drive to permit rotating the kiln in the event of a failure in the electric power supply system.

The kiln tires are equipped with upper- and lower-limit alarms. The carrying rollers are made of cast steel with the shafts cast integrally. These shafts are hollow, thus permitting the circulation of water through them for water-cooling. Carrying roller bearings are provided with built-in automatic Ferris Wheel oil lubrication, and are provided with oil-tight and dust-tight seals. Kiln bearings are of the ball-and-socket self-aligning type.

The complete combustion system for the kiln, including burners, oil pumps, oil heater, gauges, thermometers, etc., was furnished by Staples & Pfeiffer.

The Kennedy deheater, almost identical in construction with the preheater, and also operating in conjunction with its corresponding exhaust fans, dust collector, etc., serves a double purpose in that it acts as a "soaking pit," thus allowing for the definite and final calcination of any partially-calcined particles that may have come out of the kiln. Air for cooling lime is preheated, this preheated air being delivered to the kiln for combustion and thus increasing thermal efficiency.

The central switchboard, which can correctly be called the "brains" of the plant, is located in the same platform as the kiln hood, and contains the following instruments:

CO_2 indicator and recorder

4-point thermo-couple register for the following:
- Temperature of gases leaving kiln
- Micromax indicating and recording Rayotube for recording temperature at the discharge end of the kiln

3-point temperature recorder for the following:
- Temperature of gases leaving kiln
- Temperature of gases entering preheater, exhaust fan
- Temperature of air leaving primary cooling section of deheater

One 4-point draft indicator:
- Suction at preheater exhauster inlet
- Suction of dust chamber
- Suction at firing hood
- Pressure of primary air

One kiln travel limit switch

One 12-in. dial electric clock

Two light sockets

Three temperature alarms

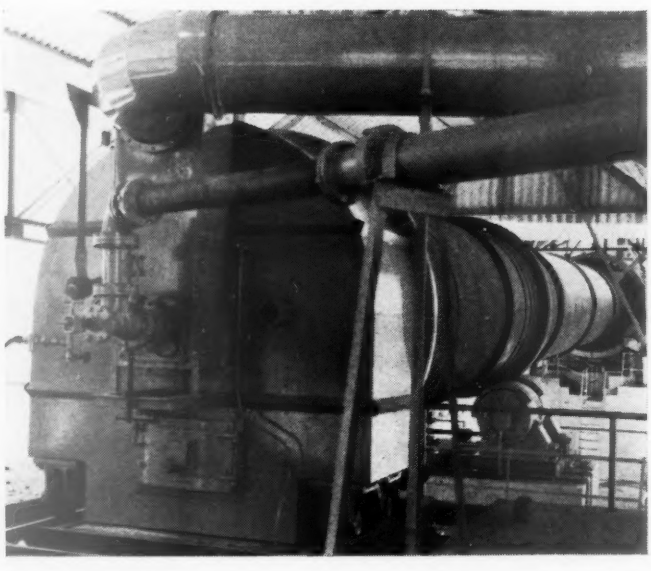
Push button stations with indicating lights for: kiln motor, preheater fan motor, preheater feeder motor, air seal, bypass feeder, deheater primary fan, deheater secondary fan, deheater feeder, lime pan conveyors, lime elevator.

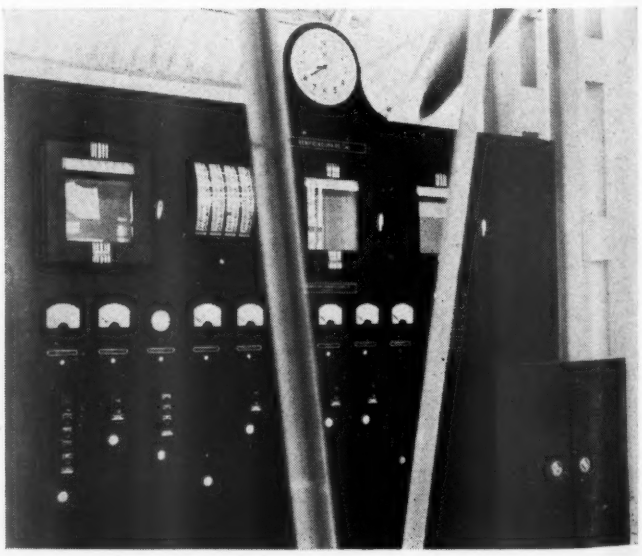
Louvre damper—position indicating and operating lever.

Ammeters—radio indicating type, 3½-in. dial, for each push-button station listed above.

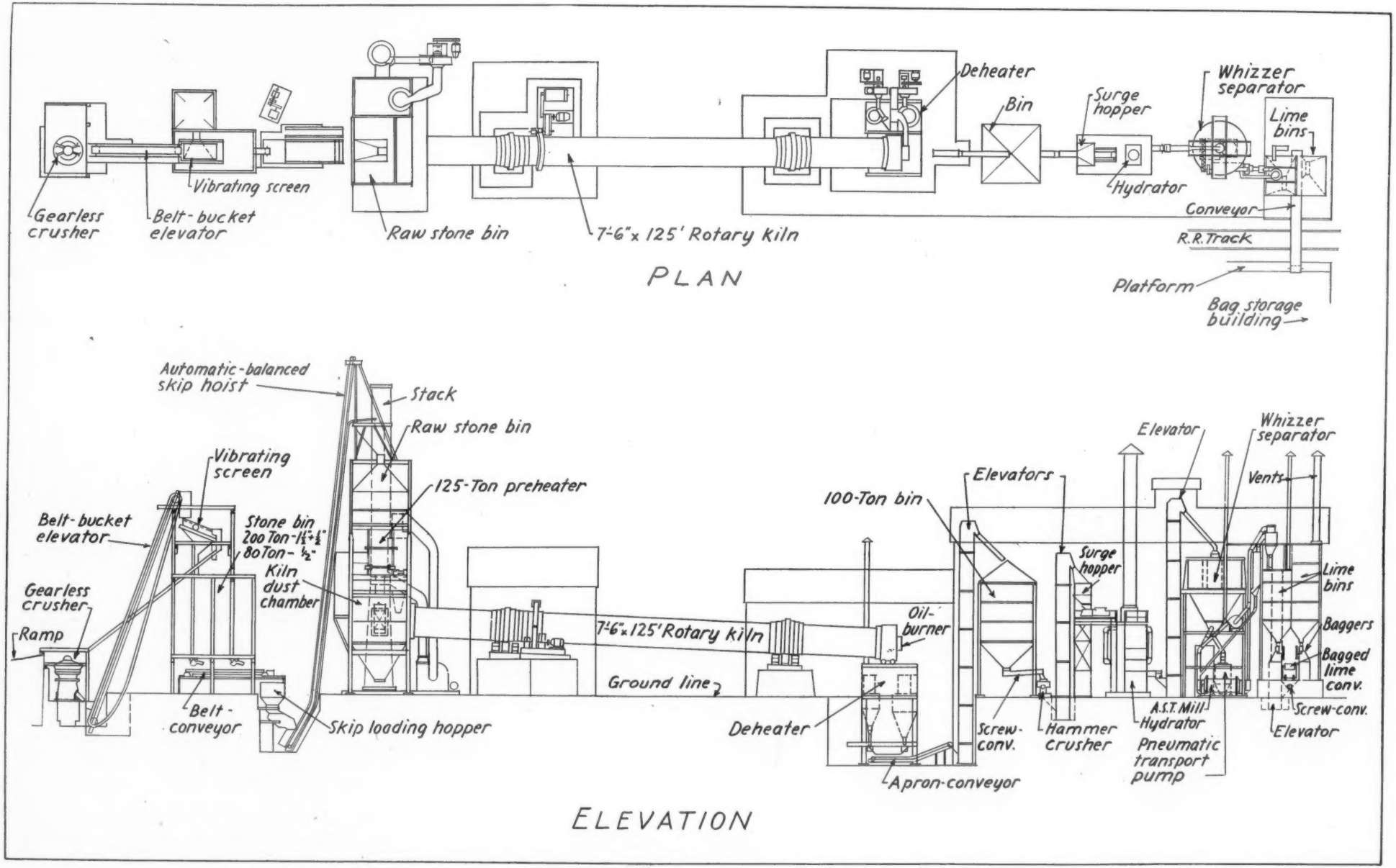
An apparently insignificant detail, but of tremendous importance in the relations between American manufacturers and Latin American countries, is the fact that this switchboard contains legends in both English and Spanish. Kennedy-Van Saun is one of the few firms in the U. S. A. having this consideration for their Latin American clients, and certainly this shows a new trend in American industry in catering to Spanish-speaking countries.

• A view of the kiln from the firing hood platform.





• The central switchboard, showing legends in English and Spanish.



• Plan and elevation of the facilities of Beneficiadora de Cal, S.A., at Calera, Hidalgo, Mexico, showing the correlation of various units.

Hydrating Plant The Kennedy deheater discharges directly and continuously on a Kennedy pan conveyor, which in turn discharges to a Kennedy bucket elevator.

It is worthy of note that the limestone discharged by the Kennedy deheater is of such temperature that it can be handled by bare hands; as a matter of fact, in a similar installation being operated by the Nevada Consolidated Copper Co., in Hurley, New Mexico, this lime discharges from the pan conveyor onto a rubber belt conveyor, showing to what extent the heat is recovered from the lime on cooling.

The bucket elevator mentioned above discharges to a 100-ton, completely-covered calcined-lime bin just ahead of the hydrating plant. From this bin the lime is fed by a 10-in. by 12-ft. screw conveyor, with a 5-hp. motor, to a Kennedy Type D hammer mill with ¼-in. grids. The hammer mill is coupled to a 10-hp. motor.

The discharge of the mill is taken by a Kennedy bucket elevator, 30-ft. centers, and operated by a 7½-hp. motor, which in turn discharges to a surge hopper just ahead of a Schaffer poidometer, after which the necessary water for hydrating is added.

The hydration is carried out by a No. 3 vertical continuous Schaffer hydrator, operated by a 15-hp. motor, and with a 5-hp. motor for the mixer. This is the first Schaffer continuous hydrator in the Republic of Mexico; it has the necessary capacity for hydrating the kiln production 16 hours per day. This characteristic was insisted on by the Echeverria brothers, in order to have 8 hours during which necessary repairs or cleanups could be made in the hydrator.

From the hydrator, the product is conveyed by a Kennedy screw conveyor to a 30-ft.-center Kennedy bucket elevator, which feeds the hydrated lime to a 14-ft. Raymond double-whizzer air separator. The separator throws out the lime which, being practically 10 percent calcium carbonate, has been completely calcined and hydrated and therefore can be considered chemical lime. From the separator it is taken by a No. 4 Kennedy-Van Saun pneumatic pump and conveyed directly to a bagging bin.

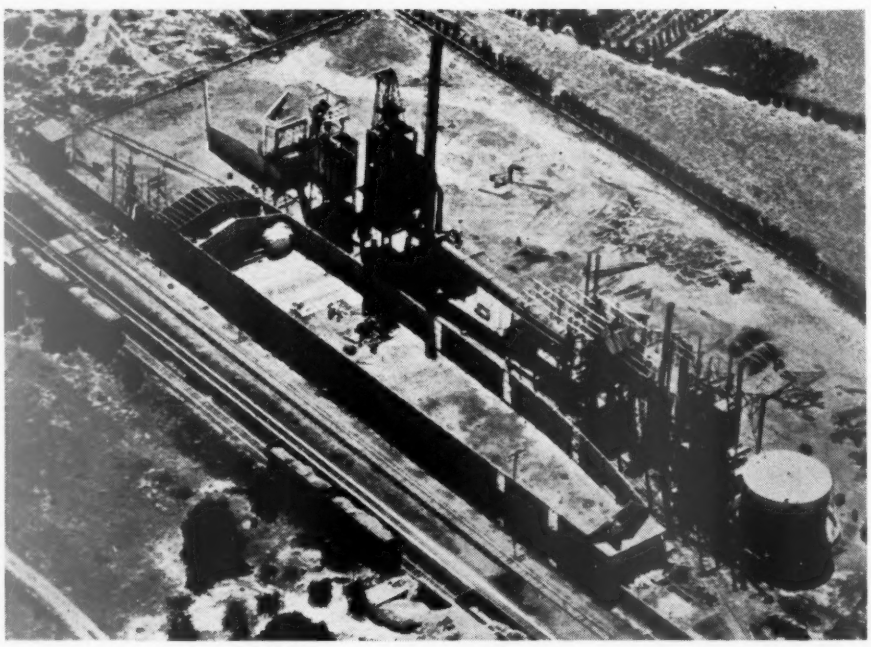
The oversize from the separator, which contains impurities such as silica, etc., discharges into a 3- by 8-ft. Kennedy airswept tube mill, from which the finished product, commercial lime, goes into a separate bagging bin.

The two finished product bins are equipped with 2- and 3-tube Bates bagging machines. These discharge onto a shuttle belt conveyor, which can be made to discharge to trucks, railroad cars, or to a chute leading to the company warehouse. Below the two bagging machines is a Kennedy screw conveyor which transports the spillage to a bucket elevator; this in turn sends it back to the circuit.

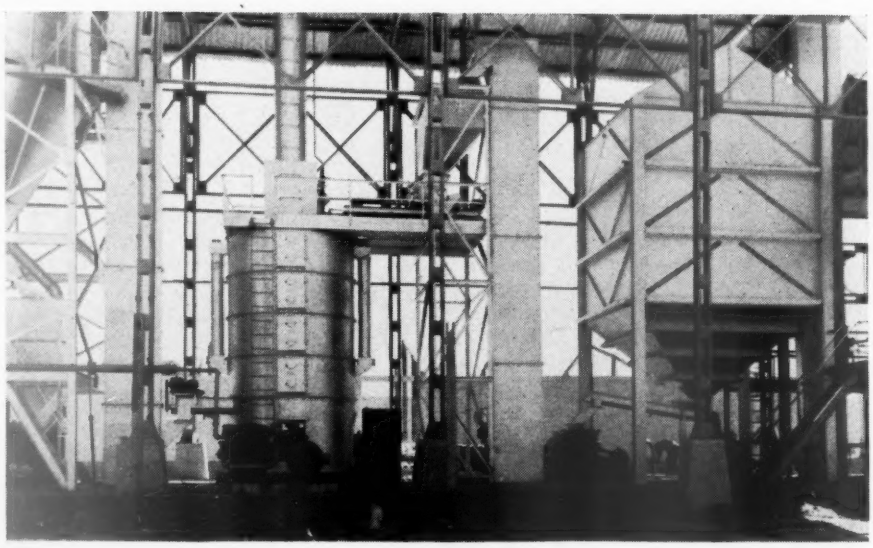
Bins and elevators are all completely enclosed to eliminate the dust as far as possible.

Power The electric power for the operation of this plant will be furnished by the Mexican Light and Power Co., of Mexico City,

(*Continued on page* 101)



• An air view of the Beneficiadora plant, taken before its completion.



• Detail of the gearless gyratory crusher, equipped with a synchronous motor.

• Left: A view of the vertical continuous hydrator, showing the lime bin, screw feeders, hammer mill, bucket elevator and poidometer.

Minerals Other than Calcium in Agstone Are Often Overlooked

By W. D. KELLER
Professor of Geology
University of Missouri

another P and Q exclusive

CURRENT practice and policies of producing and using agstone tend toward leaving in the rock ledge, in many cases, the "cream of the rock" while the "skim milk fraction" is vigorously promoted. This may be due to an unfamiliarity with the late science of soils or to a shortsighted sense of values. Too much emphasis is now being placed on a high equivalence of $CaCO_3$ in limestone, in the implication and misconception that everything else is deleterious. Such an emphasis overlooks the potash minerals, some phosphate, or the vitally important trace elements, like manganese, cobalt, copper, and boron which may occur naturally within some limestone formations as "impurities", and which, too readily considered such, may actually enhance the value of those rock formations considerably above that of purer $CaCO_3$ stone. Agstone producers stand to profit by investigating and taking advantage of the potentialities of the raw materials and selling a premium limestone or a "fortified" agstone. Producers may well consider this idea and learn how it can be put into practice.

A Stepchild Adopted by Farmers

But first let us examine the way in which the agstone industry evolved and then let's do some thinking and planning about it. The first man to put limestone on soil no doubt lived long before there were newspaper reporters around to record the event. As far as commercial limestone producers are concerned, agstone came into the picture as a disposal of by-product fines and dust from commercial and chemical stone crushers, beginning with the time that soils investigators were being concerned about acid soils, and some otherwise non-productive soils for which acidity was unjustly blamed. The cheapest alkalinizer that could be found was raw limestone, and it did not take extensive urging for the operators of stone crushers to turn over their fines and thereby turn an honest nickel, all for the purpose of correcting soil acidity.

Naturally the limestone with the most $CaCO_3$ and least insolubles had the highest alkalinizing property and thereby the idea arose that the purer the limestone in $CaCO_3$, the better the stone for agricultural purposes. Certainly there was no point in hauling 15 percent weight of sand and clay minerals other than calcite, $CaCO_3$, on the field when one wanted as much neutralizing power as possible.

Professor W. D. Keller

Limestone a Calcium Fertilizer

But objectives are now changed. It has been shown that the greatest benefits from liming the soil come from the *calcium and other elements*, and not from the neutralization of acidity. Indeed, it has been demonstrated that *some acidity is desirable and necessary* for maximum crop growth on the average general farm. Therefore, the real objective is to add calcium, often magnesium also (as in dolomites, dolomitic or magnesian limestones), and potash, phosphates and trace elements which the plants need as nutrients. County agents know this, the better farmers have learned it, the more specialized fertilizer companies are certainly aware of it. An opportunity is now open to agstone producers to furnish material which is to be most in demand.

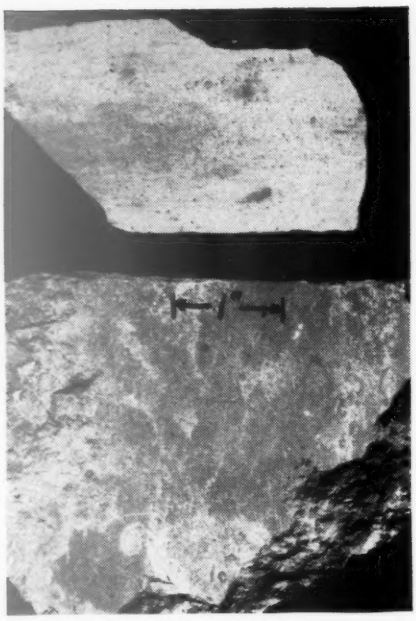
Before going directly to the specific problems of the stone producer, the view of the problem at large should be broadened and agstone needs considered. Fundamentally, plants evolved on soil which gave them a comparatively balanced diet of nutrients which had their inorganic source in a variety of rocks and minerals. The plants today need the same balanced diet. Calcium is in heavy demand and because calcium is also easily leached out of the soil, limestone is the core about which agstone is to be built. But when calcium limestone alone is added, it may, because of its several chemical effects on the soil, stimulate plant growth so that the soil may soon become deficient (for practical purposes) in several other rock and mineral nutrients. The solution is to add other mineral nutrients—either in the form of limestone containing some of these nutrients, or higher-priced fertilizers. Agstone producers will be interested in what other elements can be added in limestone.

Other Elements

Magnesium is an element which has been deficient in the soil of many localities and in many plants. In localities where dolomites, $CaMg(CO_3)_2$, or dolomitic limestones are available, a deficiency of magnesium is a disgrace to good agriculture and good agstone production. It costs no more to quarry dolomite than calcite limestone, and geological study has shown dolomite to occur in all variations from relatively pure $CaMg(CO_3)_2$ through spotty mixtures of dolomites and calcite, $CaCO_3$, to pure calcite. From a single quarry both kinds of stone may be taken and crushed in any desired proportion.

Potash, a high-priced fertilizer element, is present in certain limestone formations as an "impurity", the soft, green to greenish-brown mineral called glauconite. Glauconite is easy to recognize. It averages about 6 percent potassium oxide, K_2O. A glauconitic dolomite agstone would supply calcium, magnesium, and potassium; it should pay to locate a quarry in this variety of rock, or to recognize it in a quarry.

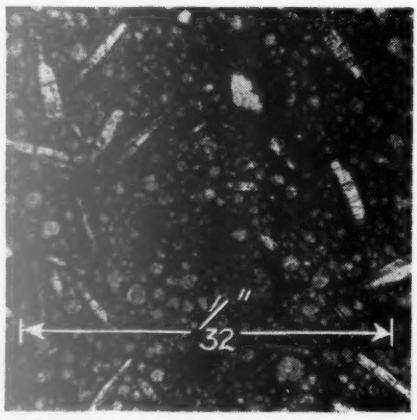
Glauconite is the chief mineral of the "green sands" in the New Jersey coastal plain, and in older rocks which crop out in a wide band along a circular arc which swings down the East Coast and across the Gulf region into Texas. Glauconitic dolomites and limestones occur in many of the states in the Union. In Wyoming the igneous rocks of the Leucite Hills, and in Arkansas some of



• Two different limestones composed of a mixture of dolomite, $CaMg(CO_3)_2$, (light colored portions) and calcite, $CaCO_3$, (dark colored portions). A rock surface has been ground flat in these specimens and then immersed in a copper nitrate solution followed by ammonia, whereupon the calcite stains blue while the dolomite remains unaffected.

the igneous rocks in the Magnet Cove region are rich in potassium, as well as in other elements. Not all agstone need be limestone!

Phosphate occurs in nature as calcium phosphate (instead of the calcium carbonate of pure limestone) and may range downward in quantity from phosphate ores to mere "impurities" in limestone. Fossil-rich limestones, occasionally nodular limestone (those darkest in color), or sometimes those of greenish color (those which give off a fetid odor when freshly broken) are most likely to contain phosphatic material. With the current demand unfilled for phosphate fertilizers, both acid-treated and raw rock phosphate, it is easy to understand how an agstone containing a little calcium phosphate "impurity" would be preferable to one which was all calcium carbonate. The idea is not to ship slightly-phosphatic agstone a long distance in competition with phosphate fertilizer, but rather to furnish it as a local agstone with a premium rating over one that is 100 percent calcite. Phosphatic shales which run fairly high in carbonates may be very useful agstone. It is easy to test for phosphate because it forms a tell-tale yellow compound when it is tested with a nitric acid solution of ammonium molybdate. State geological surveys usually know what formations contain phosphate in their states.



• Left: A potash-bearing (approximately 10 percent K_2O) igneous rock from Wyoming, magnified about 65 times under a microscope. The potash mineral, called leucite, occurs in the small rounded grains making up most of the rock.

• Right: Glauconite (dark in photograph; dark green in natural color) present in a dolomite (light color) formation. This rock will furnish calcium, magnesium, and potassium to soil. This specimen came from southeastern Missouri.

Value of Trace Elements

Another group, or part thereof, of mineral substances which may be furnished by agstone are the trace elements. These elements are needed in only a few parts per million, in only the slighest traces; hence their name. They are, however, as vitally needed as a tiny spark plug is needed in a heavy engine. These elements are particularly manganese, cobalt, copper, and boron. Without them in the soil, and thence available through plants to animals and man, very serious nutritional deficiencies occur. These deficiencies may manifest themselves in stunting, spotted foliage, immature and slow growth, and nutritionally defective fruit of plants, and in lameness, deformities, sterility, anemia, stunted growth, weak bones, low milk production, and high susceptibility to Bang's disease in cattle and other diseases in various animals. The story of mineral supplements for animal feeds has been plugged so thoroughly on our breakfast radio programs that no further mention need be made except that these mineral supplements are not necessary where the plants and grain used as animal food received a full measure and variety of mineral elements. The full significance of mineral deficiencies in man's food can be far-reaching and is most serious. With deterioration of soil fertility and nutrients comes deterioration of national health, vigor, and resistance. Our nation could conceivably thereby succumb to a more vigorous foreign power.

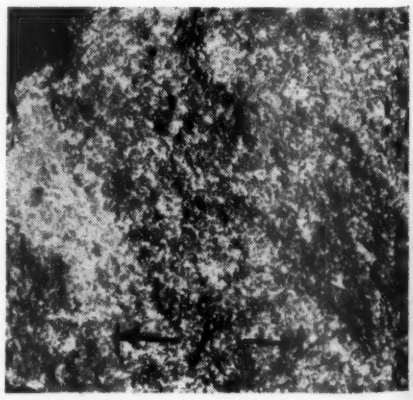
The logical place to correct trace element deficiencies is in the soil, and the natural way is to restore the elements via crushed rocks and minerals, that is by fortified agstone. This may be achieved in several ways. First, some limestones contain naturally a small amount of manganese, which alone may meet a soil deficiency. Second, manganese may be added at the crusher by feeding in small amounts of manganese-bearing shales, or of manganese ore from deposits which are too low in grade to be mined as commercial manganese ore and could be bought on a rock basis. Third, manganese could be added as acid-treated rock, or a sulphate salt, which is soluble and quickly available.

Low-grade, manganese-bearing rock is widely prevalent in the United States, although ore-grade manganese deposits are strategically rare. Most igneous rocks contain small amounts of manganese; and again this writer wishes to refer to the possibility of using igneous rocks—especially those rich in magnesium and calcium, and the glasses—as slower acting (than limestone) but longer lasting agstone. Stone producers in igneous areas may well give this some thought.

Cobalt is needed to the extent of only about one two-hundredth, or one half of one percent, of the extremely small quantity which suffices for manganese. Fortunately only a small amount is required; its minerals are not abundant. However, cobalt is commonly associated with sedimentary ores of manganese, and these elements may be added together. Other sources of cobalt are mineral combinations of it with copper, nickel, sulphur and arsenic.

Copper is needed in very small amounts and may be supplied from copper-bearing rocks which are too low-grade to be ore, or from crude commercial "bluestone," copper sulphate. Low-grade surface copper minerals are usually the green carbonate and hydroxide which may stain limestone. Copper also occurs in combination with sulphur and iron.

Boron completes the list of trace



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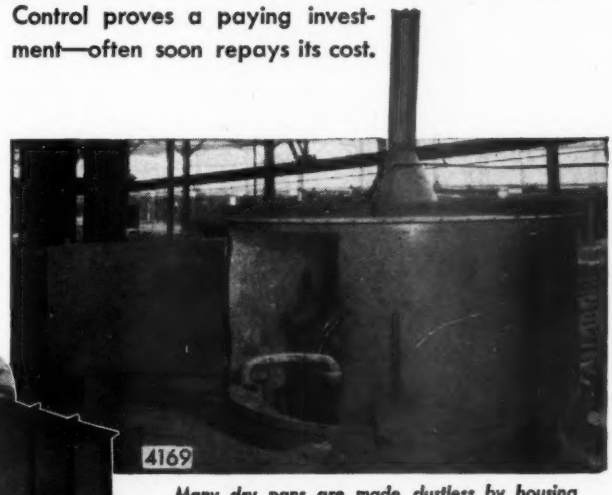

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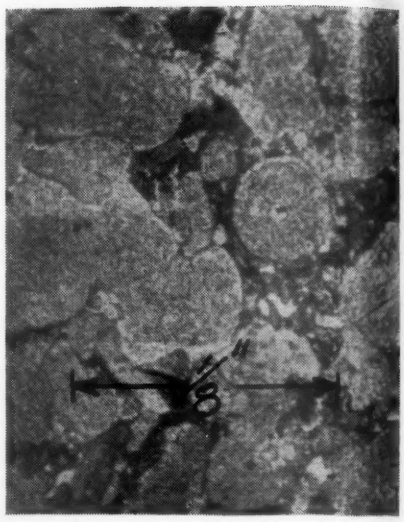


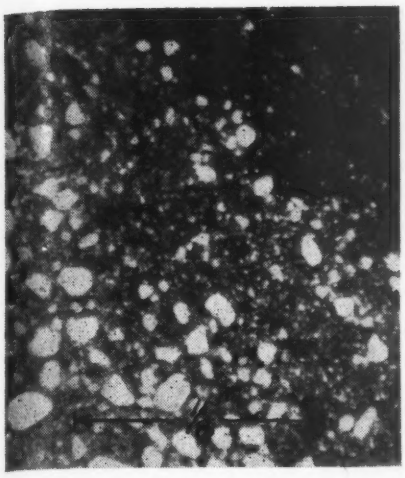
● A coarse-grained limestone which contains a few fossil fragments magnified about 10 times. This rock is about 99 percent $CaCO_3$. The line is about 1/8 in. long between arrowheads in the unmagnified original specimen.

elements to be discussed. It is known to occur in some limestones as an "impurity" and may be more widespread than ordinarily recognized because chemists rarely analyze for it. Crude borax or the minerals from which borax is derived are not very costly, considering the very small amount that fills the trace element need.

Advantages in Fortified Agstone

With this back-log of information, we are ready to proceed to the practical problems of an agstone producer who wants to develop his product or locate a quarry in order to furnish a fortified agstone. What should be done? First he should find out what he is producing in his present operation. That requires a complete chemical analysis, probably supplemented by a spectographic chemical analysis for the trace elements, both to be done by a competent laboratory, and on a sample or samples which are *representative* of the stone from each quarry. Because the chemical compositions of stone can vary appreciably laterally within a single quarry face if it is large, perhaps more than one analysis should be run. Because different layers or beds of rock within a quarry may vary in composition, they should be represented in quantities proportionate to their thicknesses in the sample for analysis. If beds are noticeably different they should be analyzed separately. A grab sample, or a mixture which is not representative of the beds of rock, may be very misleading as to what the quarry will furnish.

After the operator knows what he has in his stone, he is in a position to decide whether or not he



• The large, light-colored particles ar quartz or fine silica sand—the same material which is put on sandpaper. When found in fine-grained dolomite, as in this sample, the silica sand is a most undesirable impurity. Although these impurities (magnified here about 10 times) are invisible to the naked eye, their presence results in excessive crusher wear.

wants to round it out with trace elements, blend it with another stone, concentrate on certain richer layers in the quarry, or open another site where a more desirable stone is available. Possibly the formation above it or below it may contain a small percent of potash, phosphate or trace elements, and consequently a quarry downstream, or on a higher hill may provide naturally what is wanted.

The best sources of information about the distribution of rock formations, and those which contain the desired "impurities" are usually the state geological surveys, and the geology departments of universities and mining schools. They are able to advise where below-ore-grade, low-priced deposits of minerals may be developed.

To determine the soil needs of the natural sales territory around the quarry, inquiry may be made of the county agricultural agents, the farmers, the soils departments of agricultural colleges, soil surveys, PMA (AAA) agencies, and the county PMA-AAA) boards. From general considerations it will be best to enlist the cooperation of the local county agent and the PMA (AAA) board in your development work. They should be some of the best boosters for your improved or fortified agstone.

With the knowledge before the agstone producer as to what he has in his quarry, what the soil and the consumers in his trade territory need, and what "impure" limestone or trace element minerals are available, it becomes a problem in simple arithmetic of cost and sales as to

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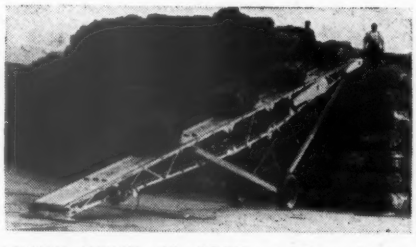

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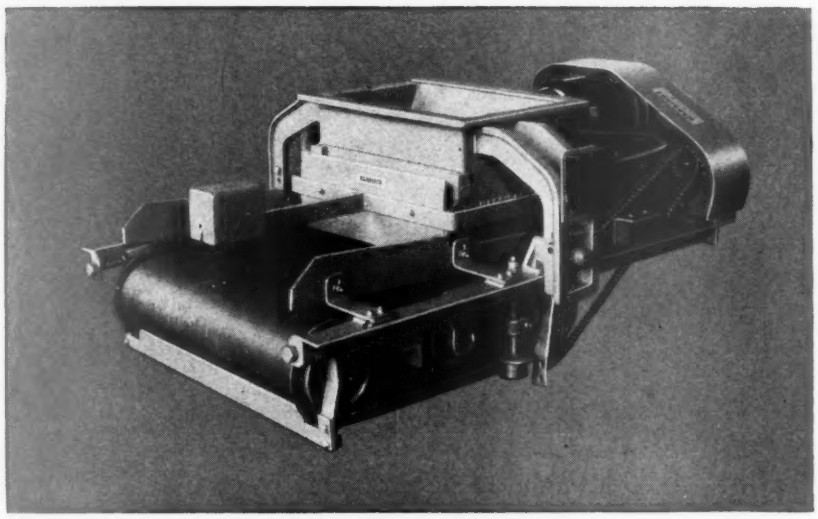


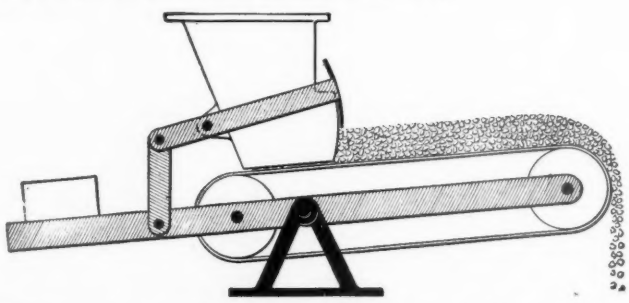
HARDINGE Constant-Weight Feeder

If you are troubled by feed rate fluctuation—study the diagram below carefully.

It shows the operating principle of the Hardinge CONSTANT-WEIGHT Feeder.

The weight on the left counterbalances the moving feed on the belt at the right. If the feed density changes, the balance is disturbed and the feed gate opening increases or decreases to compensate.

Thus a constant-weight rate of feed is maintained, even though the volume rate (c.f.m.) and size of feed may vary.



For applications where weight control is not essential, Hardinge also builds Disc Feeders, Volumetric Belt Feeders, and Volumetric Non-Flooding Drum Feeders. Write for Bulletin 33-D which describes the complete line of Hardinge Feeders.

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what he wants to do to meet the situation. Not every locality will have every desired mineral element close at hand and occurring naturallly, and not every agstone will be completely balanced for the local need; but the current situation can be much improved. More detailed knowledge about the chemical composition of the geologic formations may be needed than is immediately available, but such a deficiency is usually quickly filled by state or governmental agencies when there is a demand. Some initiative will have to be taken by the agstone producers but the move should pay off. The first producer or group of producers to develop a fortified agstone in a community will be in a preferred position to reap the profits of the venture.

Expansion at Maple Grove

(*From page* 85)

and "Syndolag." Their principal use is in maintaining (or fettling) the slag line of open hearth and electric furnaces. The two products differ primarily in respect to sizing.

Basic Refractories also produces and sells raw dolomite for use as a refractory in open hearth steel making, as a flux in blast furnaces, as concrete aggregate, as railroad ballast, and as an agricultural liming material.

A few statistics will serve to indicate the scale of operations at Maple Grove. The quarry produces 1,500,000 tons of stone annually, placing it well up among the largest in the United States. The plant consumes more electricity and pumps more water than the nearby city of Tiffin with its population of nearly 20,000. It is not unusual for the plant to load more than 100 cars in a single day, and more than 20,000 are handled in a year.

With its burning plant expansion program only just completed, Basic Refractories has already begun work on new facilities for the production of basic brick for use in rotary kilns. This development constitutes rather an abrupt break with the past, since throughout its history Basic has limited its production (for sale) to granular refractories. For the past 10 years the company's own rotary kilns have been lined with brick produced in a pilot plant at Maple Grove. The very satisfactory performance of this product under temperatures well above 3,000 deg. F. has finally brought about a decision to enter the field on a commercial basis.

New Kiln at Beneficiadora

(*From page* 94)

from their plant at Juando, Hgo., at 22,000 volts. This current will be stepped down to 440 volts, 50 cycles, 3-phase, a.c., by a bank of three 300-kv.a., one 70-kv.a., and one 10-kv.a. Westinghouse transformers.

Operators The operators needed for the satisfactory operation of this plant will be approximately as follows: for crushing: two, and possibly three on the day shift; calcination: one shift boss on each shift, who will probably be the plant boss, and a clean-up man only on the day shift; hydrating plant: one operator per shift; bagging: one (possibly two) on bagging on the day shift.

QUARRY

To place their quarry on a basis of efficiency and economy corresponding to their calcining and hydrating plant, the firm will in the near future install the following equipment for quarry operations: compressor and wagon drill for blast hole drilling; one ½- or ¾-cu.-yd. shovel; one or two 15- to 20-ton end-dump trucks.

GENERAL

With only the railway siding between the kiln and hydrating plant on one side, and the warehouse on the other, the company has built a warehouse with 14,446 sq. ft. floor space. This warehouse is of more than ample capacity for the storage of their finished products, paper bags, and all the needs of the plant. Facilities are provided for loading to railroad cars from either side of the warehouse or to trucks.

For fuel storage the company has put up bolted steel tanks with a capacity of 800,000 liters (approximately 200,000 gallons), from which the fuel will be pumped to the combustion system of the kiln.

A well has been drilled to supply the water necessary for hydration, for the cooling of the equipment, and for general utility purposes. It is expected that approximately 660,000 liters, (approx. 165,000 gallons) will be required in 24 hrs.

Small but neat offices, shops and housing facilities have been provided with all comforts and facilities, and in keeping with the first-grade caliber of the plant they have put up. They have also built a small library and a recreation room.

From the foregoing it will be seen that when this plant is inaugurated, it will be one of the most modern plants of its type in the world. Utilization of maximum efficiency will result in minimum production costs and top-quality products.

In the very near future Beneficiadora will grind the fines discarded by the shaking screen at the head of the kiln and put them on the market as agricultural limestone.

The inauguration of this plant will really be a far-reaching step in the industrialization of Mexico; and we hope that it will serve to stimulate the rest of the nation's industries and those of Latin America as well.

Drought Cuts Production Of Nonmetals in California

Cement, aggregates and other nonmetallic-minerals-producing plants in California are feeling the effects of the greatest drought in the state's history. Production at many operations are being halted one or two days a week in critical areas to conserve electric power. Hydroelectric plants are diverting as much water as possible for irrigation purposes rather than utilize it for power generating.

Water is being rationed in many areas of the San Joaquin Valley and the state went on emergency daylight-saving time in March to conserve light and power.

Shovel Operators Are Talking About . . .

A revolutionary new power shovel clutch that provides smooth, positive action in place of jerky, uncontrolled performance . . . a clutch that seldom requires adjustment . . . a clutch with only one working part, and without a single cam, lever, bolt, piston or valve.

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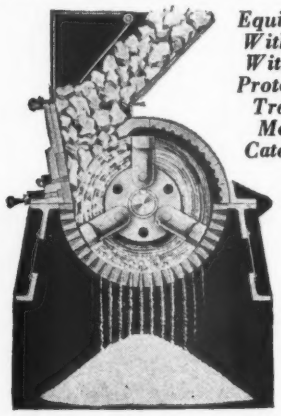
The Adjustable Feature of a Gruendler Two-In-One gives you either a cubular crushed rock (no slivers or finger stones) for road or construction work —or will produce a uniformly crushed limestone ideal for mixes and topping or for Agricultural purposes.



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A New Lime Plant

(*From page* 89)

and for pulverized quick lime is provided by two 16- by 20-ft. silos with the usual packing and loading facilities.

The high degree of similarity between the lime and limestone precessing equipment is a feature of the plant design which will undoubtedly contribute to low maintenance costs.

Present plans call for installation, during the coming summer, of a stone dryer which will utilize the waste heat in the lime producer exit gases.

All stone products are marketed under the brand name "Texrock".

Figure 7 shows a flow diagram of the facilities provided for the processing plant. The entire layout is compact and is designed to function efficiently with a minimum of manpower. The operating force at the Cleburne plant totals 17 men, making a total of 27 for the entire operation.

Plant construction is fireproof throughout. As at the quarry, steel and concrete indicates long-range planning. Ample room has been provided for future expansion.

General The plant office, storeroom, laboratory, and 50-ft. platform scales are housed in a single building. The laboratory is small but complete and has all the equipment necessary for testing both the chemical and physical properties of all products.

The plant is located within the Cleburne yard limits and prompt car. movement over the Santa Fe Railroad is assured. The proximity of through highways provides for equally good trucking facilities.

Market surveys indicate a potential demand for the products of the new plant far in excess of its ultimate capacity. There is every evidence that the complete line of high calcium lime and limestone products offered will satisfy only a part of the immediate demand.

Construction of both quarry and Cleburne plant facilities was accomplished by Allhands and Swatzell, general contractors, of Cleburne. Jerry Swatzell and his able staff had the job well in hand at all times in spite of constant delays resulting from failure of equipment manufacturers to ship on schedule.

The owners' refusal to adopt makeshift measures has resulted in a plant of which both they and the designing engineers may well be proud. The fact that all concrete work has been rubbed to a smooth

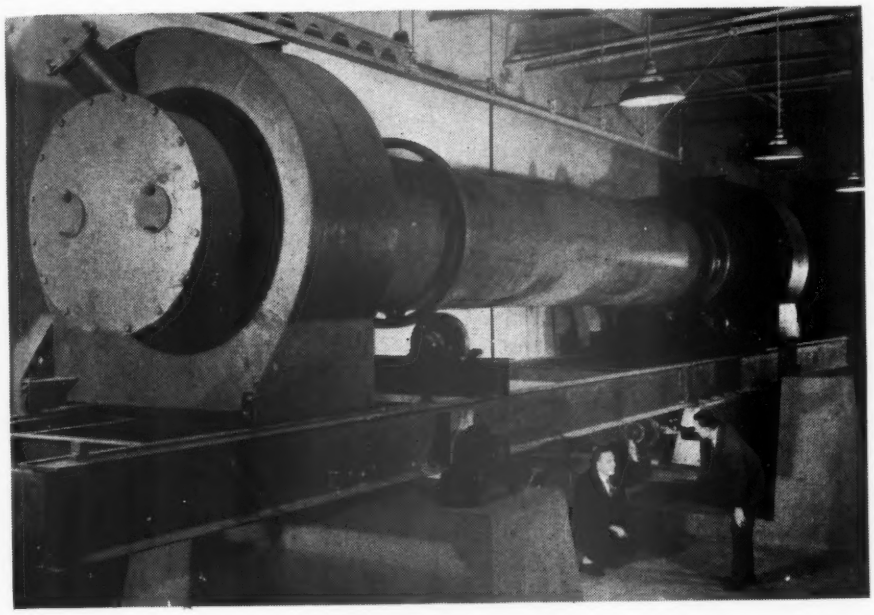
(*Continued on page* 104)

30-Foot Kiln Installed in Allis-Chalmers Laboratory

Installation of a new 30-ft. long, 39-in.-diameter rotary kiln, major unit in the pyro-processing section of the Allis-Chalmers basic industries research laboratory, has been announced by G. V. Woody, manager of the company's basic industries machinery department.

The 72,000-lb kiln supplements a smaller-capacity flat hearth roaster. Propane-gas-fired, it is fed continuously, either wet or dry, from the grinding and classifying circuit, and operates as an integral part of the concentration section, permitting a close control of the kiln feed.

Capable of operating with varying slope, speeds, feed rates, and direction of flow, the kiln is being used with other pilot mill equipment for continuous tests on burning portland cement, sintering and agglomerating iron ore concentrates, burning lime, drying, and many other



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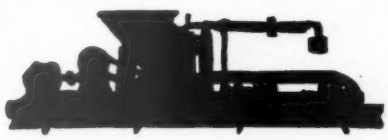

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RIGHT down the line, the SCHAFFER Poidometer clicks with producers who need a scale they can depend on regardless of conditions.

The Poidometer provides the latest type of equipment for weighing raw and finished materials — with speed, precision, and economy.

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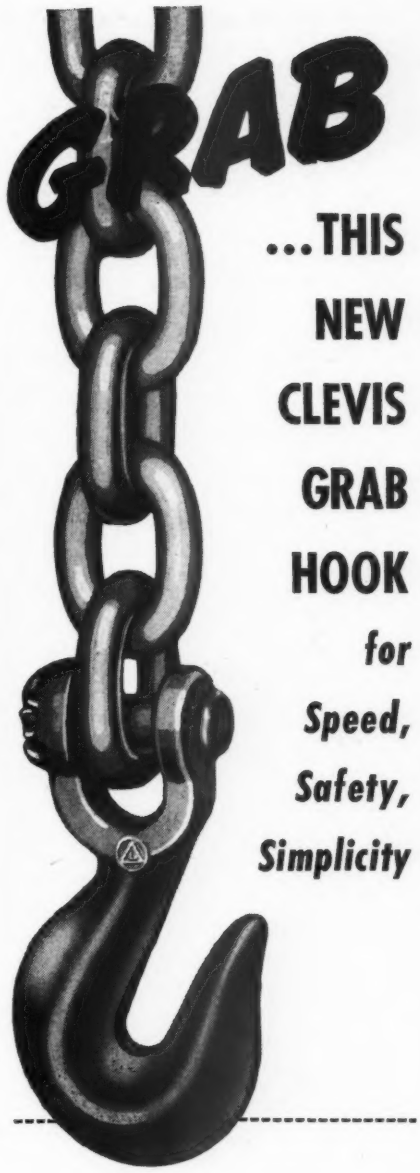

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Laughlin Clevis Grab Hooks do away with shackling . . . cold-shutting . . . cutting, bending and rewelding the chain. Easily changed from job to job.

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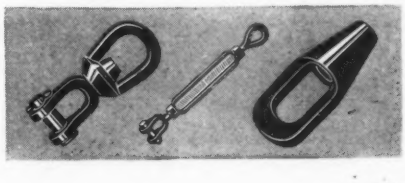

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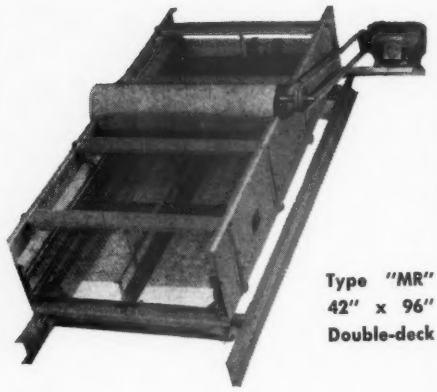

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42" x 96"
Double-deck

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There's a variety of light and heavy duty models to best fit your requirements.

It will pay you to investigate! Send for Catalog #107 on Screens and Screening.

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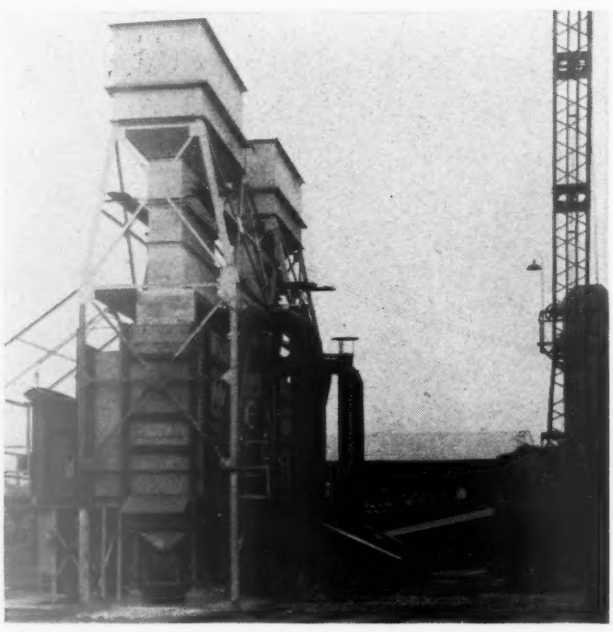

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operations.

The kiln can heat materials up to 3,000 deg. F. and special temperature- and feed-control devices are employed with feed rates of 500 pounds per hour.

Allis-Chalmers basic industries research laboratory occupies five stories and includes adjoining batch testing and pilot mill sections. Completion of the pilot mill with the addition of the new kiln, makes it possible to treat samples of ores and minerals by practically all of the known commercial processes, and to furnish customers with valuable information which cannot be obtained from small-scale batch tests alone. The laboratory employs a large staff of experienced and technically trained engineers.

A New Lime Plant

(*From page* 102)

finish and that all steel is aluminum painted gives the plant an appearance which may well be considered a model for similar plants.

J. Lambert Lain, president of the Limestone Products Company, has been the principal force in organizing the new company and getting the operation under way. For the time being the introduction of the "Cleburnt" and "Texrock" lines will fall under his direction. His son, until recently a Commander in the United States Navy, and known to his many friends as "Salty," will have charge of operations.

L.I.M.E., consulting engineers, of Hershey, Pa., are responsible for the design of the entire layout. They have supervised construction, specified equipment and assisted in its purchase, and are at present training an organization to handle every phase of plant operation.

Limestone Products Company will become members of the National Lime Association.

Quentin Best Is Quipmaster At Annual Gridiron Dinner

With Quentin W. Best, vice-president, Consolidated Rock Products Co., serving as toastmaster, more than 1,000 representatives of the construction industries gathered at the Biltmore Bowl in Los Angeles on the evening of March 17 for the 13th annual Gridiron Dinner sponsored by the Construction Industries Committee of the Los Angeles Chamber of Commerce.

Much good-natured satire, aimed at government procedures and industry leaders, marked the gathering, as it does each year. The satirical emphasis reached a high point in connection with the industries' demand that preference be given to the bid-and-contract method for public-works projects, rather than the cost-plus method.

Comic skits were presented by a number of notables from the film and radio world, including Jack Carson, Grant Withers, George Mann, Dennis Morgan, Wayne Morris, and Harry Von Zell.

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Contains complete information on the use and advantages of AMERICAN Split-Second Electric Blasting Caps. Explains how these caps reduce vibration, improve fragmentation, increase blasting efficiency.

Includes a number of practical diagrams to help simplify ordinarily difficult blasting jobs.

Available in seven firing periods, AMERICAN Split-Second Electric Blasting Caps are backed by the same thoroughness in research and manufacture that goes into all AMERICAN Explosives and blasting accessories.

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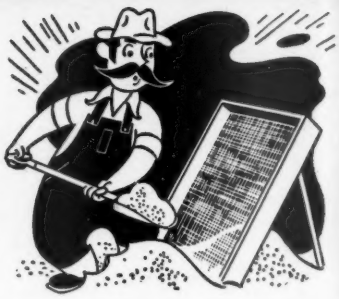


by William M. Avery

WE are on the verge of launching an investigation into the mystery of what happens to the 300 pounds of sand which we pour into our small frys' sand box each spring. For several years a flat 100-percent loss has been incurred between April 1 and September 30, and we're mighty puzzled to know where the stuff goes. Maybe two pint-sized youngsters *could* eat that much sand over a six-month period, but we find the notion just about as hard to swallow as we think the sand would be.

Recovery Problem

WHILE we're on this gritty topic, we might as well unload another item that came to our attention recently. The Chamber of Commerce of Albuquerque, N. M., received the following inquiry: "Would you please advise if there is a concern in Albuquerque that cleans toupees? The desert sand is a little difficult to shake out."

A 10-cell hydraulic classifier *might* do the trick, but we have our

doubts. Nobody's had much luck so far in getting the sand out of spinach—on the face of it, at least, a much simpler problem. Wonder what the guy wants with the sand, anyway?

Notation for Fond Fathers

A NEW line of authorized scale reproductions of equipment in our field includes a Wooldridge earth hauler, a Jaeger concrete mixer and a Barber-Greene bucket loader, according to a recent announcement by a Cincinnati model toy manufacturer. "Who knows," the announcement says, "how many of today's youngsters may turn to

construction and engineering careers as the result of fond fathers' gifts of these scale models?"

Who knows, indeed? And who also knows how many fond fathers, and mothers, too, are going to get their infernal necks broken stumbling over these little gems in the dark of the night? Our own establishment is already bulging and sagging with more rolling stock (in the form of tricycles, wagons, scooters, doll buggies, trains, trucks and roller skates) than many a modern railroad boasts. When the earth haulers, concrete mixers and bucket loaders move in, our offspring can launch their construction and engineering careers by immediately building their own quarters on the north forty. Otherwise we're moving out!

Cut It Out, Doc!

WE were leafing through the voluminous program of the Chicago Technical Conference the other day, gloating over all the infinitely dull bilge which we had no intention of listening to, when one item on the agenda pulled us up with a round turn. It was a paper entitled *Use of the Lie Detector in Industry* by Dr. O. F. Scott, president of the National Detection of Deception Laboratories. We didn't drop around to the Stevens Hotel to hear Dr. Scott, but we doubt that anything he said would have allayed our feeling that if the lie detector ever starts running amok in industry, sheer lunacy will follow in short order.

When the government announced early in the war that all workers in critical industries would be fingerprinted, droves of skilled men employed in plants all over the country took to the hills rather than face the ordeal. Bearing in mind that *they* were simply guys who couldn't afford to be identified, it doesn't call for any vast amount of imagination to picture the havoc that would be produced by an effort to pull down *en masse* the deceptions behind which all men, to a greater or lesser extent, find it more comfortable to live. Sorry, Doc, but it just won't do.

Natural Aptitude

THERE'S been quite a furor in the newspapers about the chap from Youngstown, Ohio, who underwent surgery for the removal of a layer of limestone which had encased his heart. With a wonderful start like

that, we can't understand why he didn't open up a collection agency or a loan office. Some guys just won't leave well enough alone.

Down-Wind Observation

A RECENT issue of *The Agitator,* a publication with which we'll have to become better acquainted, contains this cryptic announcement: "Arabs often use sand instead of water for bathing." The fellow who ran down that item undoubtedly has what is called a nose for news.

Better Planning Through the Use of the Natural Business Year

another P&Q exclusive

IT IS axiomatic in business that experiences in one year have strong bearing on determination of plans and policies to be followed during the next year. Management looks to annual financial statements not only as a report on the previous year's operations but also as a guide to the future. To be reliable guides, financial statements should show the results of a full annual cycle of operation.

Many businesses, however, are neglecting this key to efficient planning by using the calendar year instead of the natural business year as their basic accounting period. The natural business year—or natural fiscal year—of an enterprise is the period of 12 consecutive months ending when its activities have reached the lowest point in their annual cycle.

Financial statements drawn up at the close of the natural business year show more facts and fewer estimates. They give a complete picture of the past year's experience, without including expenses of the next operating season. They form an accurate basis for comparing operations of different years. Statements prepared at any other date cut off part of one cycle and attach it to the next, and as a result, comparison of different years is difficult and often misleading.

Natural year financial statements are more accurate because a business at the end of its annual cycle is in its most liquid condition. For example, receivables, an important item in income statements and balance sheets, are at or near their annual minimum. Since "valuation" of receivables involves a degree of estimate, the possibilities of over or under estimate are reduced at the close of the natural year.

The Time Element

Another advantage of reviewing past policies and forming new policies at the end of the natural business year is that management then is comparatively free from the usual demands upon its time. During the season of peak production or sales, it is impossible for the busy executive to give thoughtful consideration to matters of policy affecting the next year's operations. Critical review and careful planning can best be done when executives are relieved, to some extent, of heavy sales or production duties. The period between operating seasons is the logical time to negotiate sales or wage contracts, consider credit needs of future months, approve expansion plans and new equipment budgets and make other preparations for the coming year's activities.

By WALTER F. KUHN
C. P. A., Chairman, Committee on Natural Business Year, American Institute of Accountants

The use of natural business years also helps groups outside management — public accounting firms, bankers and other credit granting agencies. Because of the large number of calendar year closings at the present time, the demand for independent accounting service is disproportionately increased at the turn of the calendar year. With an excessive number of annual audits to perform, the certified public accountant finds it difficult to devote proper attention to each client. He is in a poor position to supplement his audit service with constructive counsel and advice. This unbalanced situation is relieved when clients adopt their natural business years, whose closings are spread more evenly through the calendar year.

Credit staffs of banks and credit grantors are faced with much the same problem. At the end of the calendar year they are under pressure to review and analyze within a few weeks hundreds of financial statements of prospective borrowers. If submission of these statements is distributed throughout the calendar year according to natural year closing dates, the seasonal fluctuation of the work of the credit analyst is leveled off.

Cement Manufacturers

To determine a business enterprise's natural year—at whose end its activities are at or nearest their minimum—management must study production and shipments, inventories, receivables, and current liabilities.

Consideration of these various factors in the portland cement manufacturing industry shows January 31 as the natural-year closing date under average conditions. This is the date recommended by the committee on natural business year of the American Institute of Accountants.

Since the annual cycle of cement manufacturers is often similar to those of crushed stone and sand and gravel producers, the same closing date will in some cases apply also to the latter. Two certified public accountants have reported to the American Institute, however, that they have among their clients sand and gravel producers whose natural year ends on March 31.

Within any industry some concerns obviously have cycles differing from the average. Every company must study its own operations, using those of the industry as a whole for a guide.

Cycle of Cement Manufacturers

Production of portland cement is on the upswing in the spring, and is at a high level from May to October. Its peak is in August and September. Production declines to a low point in January and February, especially in the North, because of the slowing of construction activity in cold weather.

Although cement shipments follow production trends, fluctuations of shipments are more pronounced. Shipments are highest in October, a month or so after the production high. They are lowest from December to February. The current construction boom has, of course, to some extent leveled off the peaks and valleys in shipment and production cycles.

Inventory of finished and semi-finished goods is maintained at a fairly stable level throughout the year. Stocks of finished product are normally highest in December, when they have been built up to provide for orders received during December, January and February, while production is curtailed. They are lowest in October. Stocks of clinker follow about the same pattern. The highs and lows of both, however, are comparatively insignificant.

Collections of sales payments are rapid. Receivables are high during the time of heavy shipments from May through October, and low from mid-December to February.

Current liabilities are roughly proportional to the sum of inventories and receivables. Inventory fluctu-

NATURAL BUSINESS YEAR DETERMINATION CHART

19	Production				Inventories at Close of Month: Raw Materials				Goods in Process				Finished Goods				Sales				Accounts Receivable				Accounts Payable				Notes Payable			
	$		%		$		%		$		%		$		%		$		%		$		%		$		%		$		%	
Jan.																																
Feb.																																
March																																
April																																
May																																
June																																
July																																
Aug.																																
Sept.																																
Oct.																																
Nov.																																
Dec.																																
				100%				100%				100%				100%				100%				100%				100%				100%

Form for Use With Determination Chart

Nature of business..... How long in business..... Present fiscal year.....
Location of plants..... Location of principal sources of supply.....
Stocks listed on..... Exchange Bonds listed on..... Exchange
Does company use perpetual inventory system?..... How often is physical inventory taken?.....
Statements prepared by company monthly..... Cumulative..... 12 months ended.....
Use made of statements prepared by company.....
Use made of reports of auditors.....
Does company use a budget?..... What is fiscal year for budget? .....
Reports to stockholders: Annually..... Semi-annually..... Quarterly.....
If partnership, do partners report income to U. S. Government for same period as partnership?.....

Comments and Suggestions

The above forms are intended for use in obtaining information with regard to seasonal fluctuations in specific businesses or industries, for the purpose of determining whether changes in fiscal years might be of advantage.

In many cases, it may not be practicable to obtain and list information for all of the columns and spaces in the chart. In others, fluctuations will be more clearly indicated by additional or substitute headings.

Information for more than one year obviously would furnish a more dependable guide to seasonal fluctuations than information for only one year. Where practicable, it should be obtained for a period of years.

Additional copies of the above natural business year determination chart may be secured without charge from the American Institute of Accountants, 13 East Forty-first Street, New York, N. Y.

ates only slightly through the year, and receivables are low in January. Current liabilities decline to a minimum in January.

Selection of January 31, then, as the natural-year closing date is based on these facts: production and shipments are nearer their minimum at the end of January than at the end of any other month; receivables are approximating their minimum; although inventories are not at their lowest, their fluctuations throughout the year are relatively negligible; current liabilities are in their low period. Furthermore, accounts closed on January 31 show the year's experience before expenses of the coming season's operations have been incurred.

How to Adopt the Natural Year

Habit and custom account for the common use of calendar years instead of natural business years. Under the federal revenue act of 1909, use of the calendar year was made obligatory. The requirement was lifted four years later with the passage of the first income tax law; but habits being easier to form than change, the calendar year had already become firmly fixed as the basic business accounting period.

Present laws permit a company to make its tax return on the basis of a fiscal year of its own choosing. New companies may adopt the desired natural business year without getting the permission of federal tax authorities. An established business wishing to change from calendar or other fiscal year to a natural business year must apply to the Commissioner of Internal Revenue 60 days before the new closing date. Requests for changes, when based on sound reasons, are ordinarily granted without further inquiry. Permission must also be obtained from state tax authorities in states having corporate income tax laws.

A separate federal income tax return must be filed for the interim period between the end of the old calendar or fiscal year and the new natural business year. If the company is subject to the jurisdiction of the Securities and Exchange Commission, an interim financial report must be prepared for that body when the period between the end of the old and the beginning of the new year is three months or longer. For full details on legal and accounting aspects of the use of the natural business year, a company contemplating a change should consult its lawyer and certified public accountant.

The Southeastern Sand & Gravel Company of Tallassee, Ala., is planning to begin operations in the Alabama River near Selma, Ala. Application for a permit has been filed with the U. S. Engineers at Mobile.

the lime plant operator

PIT AND QUARRY

by WOLF G. BAUER
Consulting Engineer

ECONOMICS OF PLANT OPERATION

PART III. INCREASED EARNINGS: WHERE TO INVESTIGATE

another P AND Q exclusive

IN Part I of the present series we discussed profit relationships with respect to output of production efficiencies and in Part II, the scientific approach toward the investment of the improvement dollar. This month we shall scrutinize and take stock of the many factors, obvious or insidious, large or small, which may prove a major drain on plant economy either singly or in the aggregate.

These profit-limiting factors are either closely related to the performance limitations and costs inherent in equipment, materials, labor, and design, or they are a direct or indirect result of ignorance or lack of analysis and plan on the part of management. Since the first-mentioned factors can be eliminated only by the correction of the latter, our next step is to present a plan of approach.

Figure 1 represents a classification chart in which some of the attack points are listed, and which should be brought under investigation. These are grouped as to basis of economic balance under consideration, i.e. production cost, production time, or production level. A classification thus made helps us not only to follow through intelligently on a program designed for increased plant earnings, but points also to the items which should receive separate cost-finding attention.

In Part II of last month's article, the method and importance of listing improvement expenditures of investments in sequence of their returns was stressed. Only generalized examples were given to illustrate the method. Specific items will now be discussed.

BASIS OF INCREASED OUTPUT

As pointed out elsewhere, the expediency of increasing plant output is often the most remunerative method when market demand is not limiting. The following items may be considered as constituting the most direct line of approach:

Equipment Increased output may call for additional process units, for the modernization of calcining, hydrating, grinding classifying, or packing equipment by direct replacement with latest types, or by alterations of existing units. The economic balances from the scientific analysis will show which items take preference over others. Often the addition of some inexpensive piece of equipment will raise the efficiency or productive capacity of another out of all proportion to the increased output so obtained. Thus a pre-dryer, a pre-screener, a de-duster, a combination grizzly-feeder, a pressure regulator, a sensitive mill load adjuster, etc., can, by their favorable effect on the processing machine, sometimes double its capacity. This may often be a cheaper expedient for increasing capacity than adding power and speed, an extra unit, or substituting a larger unit instead.

Process Scheduling In some instances it is possible to add extra shifts for processing and handling at lower cost than to add machines or increase their size. The economic balance will determine the most economical point at which such changes in

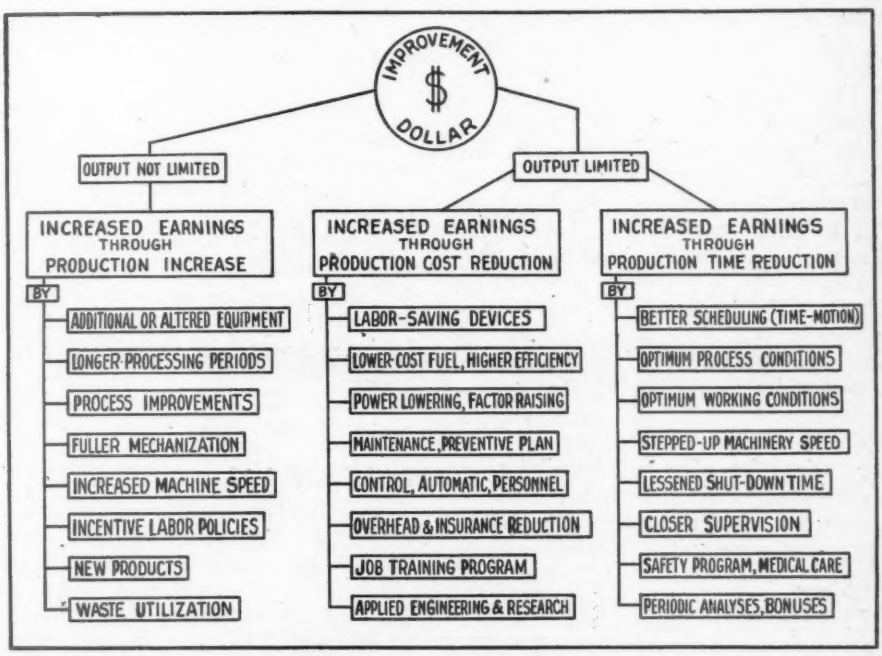


Fig. 1. A classification chart designed to aid in following a specific program and studying items which call for cost-finding attention.

plan schedule can be justified. Surge bins and feeders often play a major role in such a re-scheduling program.

Process scheduling sometimes affects peak power loads, and the even distribution of the power demands around the clock may have favorable repercussions on utility rates.

Process Improvements Frequently a change in processing technique away from the long-established practice, such as in the field of blasting, crushing, calcining, hydrating, etc. will increase output without entailing drastic changes in equipment. This may involve, for instance, changes in type of drill holes, depth of holes and shooting technique in the quarry or mine, single stage reduction crushing, burning under different fuel-air ratios, higher or lower temperatures or draft, stage separation during hydration, increase in circulating loads of oversize material in grinding and classifying systems, etc.

Output is often increased by the expediency of changing over from batch or cyclic to continuous processing in hydration and calcination.

Mechanization Machinery may replace, to a great extent, man-power in all or any stages of processing from quarry down to the loading of the finished products; this is the case especially in intra-plant transportation. Such mechanization may also increase output without eliminating manshifts, and is justified from the increased production standpoint alone.

Machinery Speed-up Careful investigations and tests may disclose the possibilities for increasing considerably the speed of conveying and processing machines. This may require certain alterations, strengthening of certain parts, increase in size of motors and power transmission, changes in bearings, lubricants, and gears, or closer and more frequent supervision and maintenance checks in conjunction with automatic safety devices and controllers. However, this item should never be overlooked. Even though a machine may currently be operating at a normal speed as advocated by the manufacturer, putting into practice the aforementioned points may well mean an overall increase in plant earnings through production increase at low alteration cost.

Labor Management Use of incentive work plan or labor production stimulation is not always easy and simple in these days of union featherbedding practice. Courage on the part of management to test and sell such methods may be required. There are many examples in industry today which may serve as a basis and guide to both management and labor when such more modern viewpoints and plans are contemplated.

Aside from bonuses, share-the-profit plans, junior stockholder schemes and similar ties between labor and its source of income, some companies have also achieved increased production through change-over from wages to piece work in certain departments of operation. This often imposes upon management responsibilities in the way of raw material provisions or removals to and from the manual operation, as well as the necessity for providing certain extra facilities and storage to handle the varying pace of such work.

Indirect Factors *Wider Marketing Radius.* This requires accurate cost figures to set up an economic balance between shipping distances and costs against increased earnings resulting from greater output.

New Products. Earnings from increased output may often be the result of adding new products such as one or all of several types of hydrates or pulverized or processed limes, special mixes for agricultural purposes, whiting substitutes, precipitated lime carbonate, ready-mixed mortar, masonry cements, insecticides, special building or plastering putties in new distributing containers, stucco or plastering sands, special aggregates and grits or granules, or ready-mixed stock feeds or soil mineralizers and road conditioners.

Utilization of Waste. Such common lime plant waste products as hydrator rejects, kiln dust, carbon dioxide, waste heat that may be used directly or indirectly for power or agricultural products, drying purposes, quarry limestone and country rock waste leading to rock wool or expanded aggregate production possibilities, and many others should all be investigated, not only for the returns they may bring *per se,* but also for their effect on the production costs of the regular products.

BASIS OF HIGHER EFFICIENCY

In a limited market, earnings increase in proportion to manufacturing cost reduction. Such cost reduction can be achieved in many ways, requiring a considerable portion of the investment dollar in certain cases, Sometimes, however, only analysis and applied ingenuity are indicated. Here again, the economic balance produced through the co-operative effort of the engineer and cost accountant will determine the order to attack for maximum returns.

Labor-Saving Devices This avenue to cost reduction often seems to be first on the agenda of the efficiency program. Usually this is justified, not only in man-hours eliminated, but also in such other benefits as increase in product quality and uniformity, especially if the human factor formerly played an important role in the process. Labor-saving devices have also indirectly raised the labor force to a higher level and type; they have improved working conditions and made use of displaced labor in other departments, resulting in increased productivity and efficiency.

Labor-saving devices are most obvious where unskilled and supervised labor can be replaced by machines of low operating cost, which do not require supervision. Conveyors, feeders, controllers, transport and loading systems such as lift trucks and pallets, or mechanical and pneumatic loaders are of this type.

Under labor-saving we must also include systems and schedules. There may still be operations where management has something to say about the manner in which it wants its labor applied (Open to debate). In such operations, one driver may serve two trucks being alternately loaded by a shovel; or a definite wage scale arrangement may be made with a worker or union whereby such an individual can be employed to check certain controls, instruments, or machines in an adjacent or separate operation, thereby eliminating a separate attendant. Careful study and resort to the economic balance will determine whether the increased wage and possible loss in production of the worker justifies such division or splitting of work.

Fuel In some lime plants fuel represents anything but a minor cost item. Reduction of its cost may be approached from three directions: (1) cost price of the fuel as bought, (2) handling and preparation cost and (3) utilization efficiency. Other sources of supply should be investigated, as well as other types of fuel. The technical-economic analysis will determine the real basis of computation, namely the relative total cost on all "available B.t.u." basis at the point of heat generation in the kiln. Thus a lower-priced fuel may furnish higher-priced heat units because of increased costs in

transportation, handling, preparation, waste, or greater difficulties in control of flames, temperature, and kiln management.

Power Increased mechanization of our plants is making power costs an increasingly critical item to be watched. A superficial testing survey with a portable ammeter-voltmeter will disclose motor loading. Frequently the changes in feeding rates, speeds, circulating loads, bearings and transmission equipment, etc., have altered the original specifications, requirements and operating conditions, and changed the plant power factor. Corrections can be applied by improving the size adaption of induction motors through switching, changing of drive speeds, installation of capacitors or synchronous motors. Decreasing the required kv.-a. will lower the power cost, increase the capacity of electrical equipment, steady the voltage, and shift the utility rates into a more favorable bracket. These energy leaks, like those discussed under fan and gas-handling technology last year, are invisible chains on profits. Operators whose Scotch nature will cause them to be extremely stingy with lights in the plant, will completely disregard the much greater losses of electrical energy being dissipated as heat in wires, transformers and the like, as a result of underloaded or overloaded induction motors.

A surprisingly large quantity of power can be wasted in the average lime plant by nonuniform scheduling of material flow to process units, thus causing power to be consumed in idling time at low power factor conditions. Claims of power-saving design in equipment should be investigated, especially when dealing with large power consumers such as primary crushers, mills, fans, dust collection systems, etc. Peak demands should be analyzed as to better 24-hour distribution when these affect the power bills and current rates.

Periodic investigations of bought *versus* generated power will bring to light significant changes in the economic balance with the developments of the times in each locality. When fuel is cheap relative to power, power may best be generated and augmented with waste heat, and stacks instead of fans may be more economical for providing draft.

Maintenance Here we need a preventive attitude, not a department merely to cure the plant ills. "Anticipative maintenance" is, for some reason, one of the most difficult policies to subscribe to, be that with machines or our own bodies and state of health. The shop staff realizes, usually much more realistically than management, the necessity for pulling a unit off production for a short check-over, not so much because it ceases to operate normally, but because it is time to do so. Such practice should not be necessarily a costly luxury so long as it is scheduled ahead and synchronized with other check-over jobs at the same time. Stand-by motors and units are another expediency for reducing down-time, and will indirectly affect costs due to repair and delays.

The investment dollar must be applied here very judiciously. A considerable analysis of shop costs is required in order to select and acquire tools and equipment for the maintenance and repair department, which will pay back such investment without question. Savings accruing from shop investments are difficult to establish and prove.

Supplying a shop with the latest equipment may not produce earnings which are necessarily higher or more positive than those obtained through the establishment and adherance to a strict and well-planned maintenance program synchronized with the operating schedule. However, both system and equipment are necessary and should be employed. Plant cleanliness and good housekeeping, along with delegation of responsibilities and provisions for ready inspection, are as prerequisite as adequate tools and supplies of repair parts.

Control This subject, inasmuch as it applies to the manufacture of lime, has been treated in earlier issues.* Its relation to manufacturing cost reduction is primarily one which is reflected in smoother and more uniform performance or processing, machines, flow of materials, power, and maintenance demands. When control is automatic, close regulation over process and conveying equipment will eliminate extra operators and waste of time and materials; when used as a means to change from batch to continuous processing, it will eliminate storage bottlenecks and awkward schedules.

Under the heading of *control,* we would like to include the control of labor in its various ramifications. Such control is exercised by upper management through its supervisors and foremen, their training, and the job-training program of the workers. Alert policies in this field of human management and control will pay back handsomely. Most smaller organizations operate under a higher proportional labor cost. Yet despite this fact, they usually have done least in this direction.

Job-training is a matter of foresight and initiative on the part of management. Job specifications should be drawn up for every position occupied by labor and supervisors. This defines the limits of responsibilities and the training required or expected and further provides the teaching basis upon which foremen must help train their force.

Personnel management or control is a psychological approach toward the development of a cooperative production spirit within the organization. The degree of insight and tact with which management meets the human equation will have very definite repercussions on the earning power and efficiency of the business. This is no longer theory, no matter whether we consider a peanutbutter factory or a lime plant. Unlike many of the other aforementioned cost-saving plans, results here are not related to the amount of money invested, but depend basically on the attitude, good will, and courage of management in developing this sense of responsibility and loyalty on the part of its employees; it is an investment which does not partake of the improvement dollar.

Engineering and Research Anything that the writer may say on this subject will probably appear to smack of commercialism, so it is with considerable reluctance that a few generalities are advanced for the sake of rounding out this discussion phase.

Whether it is the services of a consultant in the case of the small or medium-size plant, or that of the company engineer in the larger concern, a comprehensive production analysis and a scientific approach toward increasing net earnings form the basis of all future improvement. Thus the economic balances precede all really serious plans for improvement. That such an analysis can readily be made in a short time at nominal cost, should be no surprise, nor the fact that the returns are very positive and immediate. Many organizations use their engineering department primarily and almost exclusively for design and equipment installation purposes; they are seemingly unaware of the importance of welding a closely cooperative team between engineer and cost accountant, an augmentive partnership that can analyze and chart the improve-

*See Bauer, Wolf. G., *Pit & Quarry*, December, 1942, "Control Problems in Lime Manufacture."

ment and development progress of the business along the most efficient lines.

Research is a term that is frequently misused or misunderstood. Frequently trouble-shooting or investigation is confused with research. To find weak spots, errors, or shortcomings is only part of the story. The real effort and accomplishment lies in the analytical breakdown of cause and effect, and the arrival at a solution based on experience or proven fact. Whether the proven fact rests in a condition or application elsewhere in the industry, whether the fact is a mathematical or chemical truth, or whether it is established by laboratory or pilot plant results, research must conclude the case by providing the answer which best fits local circumstances.

Money set aside for research on problems of equipment design and application, process technique, production schedules, personnel management, or marketing, must always be considered risk capital. To a certain extent, all investment is, in the final analysis, risk capital. Business is built on risk for the simple reason that all business dealings are pyramided on promises from beginning to end. What we understand by research risk, therefore, is the fact that money so spent is often affected by a larger element of risk than money invested on improvements for which the results seem to be more predictable, or for which research has provided the answer.

In illustrating this premise further, we may consider upper management as having at its disposal such an investment index graph as detailed in Part II of this series. It may furthermore be assumed that funds to put into effect the improvements which constitute the first or steepest section of the curve have been applied. Ordinarily the company would now be ready to proceed with the investments represented by the next portion of the graph. In the meantime, let us say, possibilities for a new processing technique, a new product, or a revolutionary piece of equipment has appeared, the successful application of which would increase the net earnings considerably above those to be realized by the next-in-line section of the index graph. Management's decision will therefore weigh the element of risk in spending research money for proving the suitability of local conditions. It can then be seen that the index graph may thus become a helpful guide in evaluating the position of warranted risk or research capital in the improvement program of the business.

U. S. Standards Bureau Develops Mechanical Mica Splitter

During the war a study of methods of splitting mica was undertaken at the National Bureau of Standards to find a more feasible means of producing thin films than the terious hand method commonly employed. After bulk methods of delamination by physical or chemical treatement failed to provide satisfactory results, efforts were concentrated on developing a merchanical process. The resulting mica splitting machine developed by D. W. Kessler and R. E. Anderson, of the Building Stone Section not only promises to speed up the process considerably but will greatly reduce the period required to train skilled operators.

Because of common mica imperfections such as waviness or unequal spacing of cleavage planes, no precise control of film thickness has been obtained. With a gage setting for 2 mil films, a large percentage of the splits will be near the desired thickness. Occasional films, however, may vary as much as 50 percent in thickness. The quality of the machine-split films compares favorably with that of hand-split film.

The rate of splitting obtained with this device by an untrained operator was 60 films a minute—a rate that would doubtlessly increase with skill in operation. The average rate of hand splitting is between 15 and 20 films per minute.

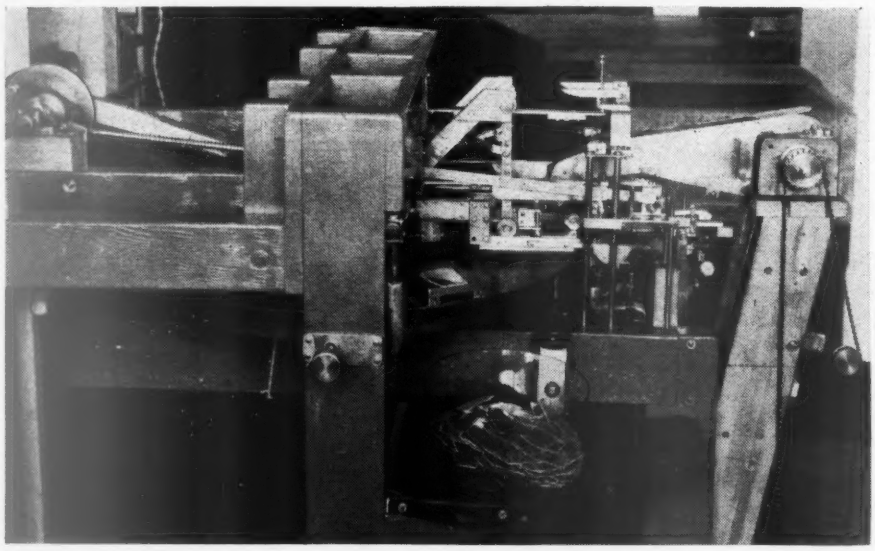
Like a hand splitter, the machine starts thin sheets by entering a sharp point into one edge of the mica block. The operator, stationed near the dish of mica blocks, places a block on the chuck and turns it under the splitter. The master valve at the center of the turntable connects the chuck to the vacuum line to hold the block in position.

On traveling forward, a carriage moves the chuck a short distance, causing the splitter gage to raise a film of mica. As the carriage returns to its starting position, two stripper blades pass under the raised film to separate it from the block. At this stage the free end of the conveyor moves down near the loosened film and draws it to the belt which carries it to a receptacle.

When one chuck is shifted into the splitting position, another comes before the operator which, when loaded, is ready for shifting. Since the turntable locks each time a chuck is in the splitting position, the operator must unlock the latch on his left, hoist the carriage tracks with a foot pedal, and shift the newly loaded chuck until it locks under the splitter.

An accurate comparison has been made of machine split mica films and films produced by an experienced hand splitter to determine differences in quality. Both types showed an occasional thickness variation over different parts of some film, sometimes as much as one-half mil. The variation in thickness of such films is a result of splits tearing across one cleavage to another over part of the surface. In such cases the torn part that remains attached to the separated film can usually be shaved off with a razor blade. Machine split films, it was found, were less scratched than those split by hand, the path of the knife being easily visible on the latter while the only scratches on the films produced by the machine were near the edge where the splits were started.

The Bureau's model was designed for small sizes of mica; therefore, a larger machine would be necessary for general use. No claims are made that all problems of machine splitting have been solved by the present machine, but its invention certainly represents a big step forward in mica splitting. Patents have not been secured, so the plans are generally available to mica fabricators.



• With this mechanical splitter an untrained operator can split 60 films of mica per minute. The average rate of hand splitting is 15-20 films per minute.

A Kansas State Geological Survey publication recently released is entitled *Cemented Sandstones of the Dakota and Kiowa Formations in Kansas.* Price, 25 cents.

personal mention

A. M. Davis

Appointment of A. M. Davis as manager of the Midwestern offices of Portland Cement Association has just been announced by Carl D. Franks, the association's vice-president for promotion. Mr. Davis succeeds to the position made vacant by the recent election of Mr. Franks as vice-resident.

J. Gardner Martin of Detroit has been appointed to succeed Mr. Davis, who has been district engineer in charge of the association's office in Lansing since 1934.

In his new post Mr. Davis will supervise the district offices and field engineers of the Portland Cement Association in ten Midwestern states. His headquarters will be in Chicago.

James Carter Weston is one of the most recently arrived citizens of Columbia, S. C. He is the son of the W. S. Westons, with whom he came to live on April 20, 1948. Mr. Weston is president of the Weston & Brooker Company of Columbia. Since January of this year he has also been president of the National Crushed Stone Association.

R. R. Bush

Roscoe R. Bush, purchasing agent of Pacific Coast Aggregates, Inc., San Francisco, was recently elected president of the Purchasing Agents Association of Northern California, Inc. This organization is comprised of about 500 purchasing agents and is one of the largest groups within the scope of the National Association of Purchasing Agents.

Mr. Bush previously served in the following offices: treasurer (1945-1946) and first vice-president (1946-1947). Before joining the staff of Pacific Coast Aggregates in 1929 he served as assistant purchasing agent for the Alaska Juneau Gold Mining Company of San Francisco.

William M. Jones, vice-president and general sales manager of the Cleveland Quarries Company, was recently elected to the board of directors of that concern.

Charles A. Wight, vice-president of Bankers Trust Company, has been elected chairman of the executive committee of Freeport Sulphur Company, effective April 15.

Mr. Wight, who is also a director of Freeport, is a director of Grumman Aircraft Engineering Corporation and of McGraw-Hill Publishing Company, Inc.

Fred O. Earnshaw, formerly president of the Carbon Limestone Company of Youngstown, O., has retired from active service after 30 years with the firm. Mr. Earnshaw will, however, remain a member of the board of directors.

The Earnshaw family had long been associated with quarry operations, both in this country and in England. Mr. Earnshaw was in his earlier life employed by the Western Stone Company of Joliet, Ill., the Earnshaw Stone Company (founded by his father) and the France Stone Company at Sandusky, O. He joined the staff of the Carbon Limestone in 1918 and became its president in 1938 after the death of Robert Bentley, his predecessor.

Mr. Earnshaw is a former president of the National Crushed Stone Association, and still serves as a director of the organization. He is also president emeritus of the Pennsylvania Stone Producers Association.

E. B. Nitchie

The appointment of Edward B. Nitchie as manager of operations and engineering of Basic Refractories, Inc., of Cleveland, was announced today by Howard P. Eells, president.

Mr. Nitchie was formerly associated with Cutter Laboratories, Berkeley, Calif., as works manager and prior to that was production supervisor for Proctor and Gamble at its Staten Island and Dallas plants. He was also plant superintendent of Durkee Famous Foods division of the Glidden Company.

Robert R. Cruse of Dowell, Ill., was named director of the Illinois Mines and Minerals Department, becoming the fourth man in 11 months to hold the office. He succeeds Thomas Moses of Canville, who died recently after serving less than four months.

Mr. Cruse is 64 years old and has spent the past 45 years in the mining industry.

obituaries

Louis H. Repass, 75, associated with the Universal Atlas Portland Cement Co., Northampton, for 32 years as secretary to the plant manager and a member of the board of directors, died on February 5 at his home in Allentown, Pa. He retired in 1930.

W. J. Van Valkenburgh, 57, president of the Blue Diamond Corp., Los Angeles, died suddenly on March 24 at his home in Los Angeles following a brief illness. Private funeral services were conducted the following day.

Born in Amsterdam, N. Y., Mr. Van Valkenburgh went to Los Angeles in 1920 and became associated with Blue Diamond, one of the largest producers of aggregates, gypsum, and cement in the West, in the following year. He was a veteran of World War I and a past director of the Los Angeles Chamber of Commerce.

Hays Buskirk, 55, president of the Empire Stone Co., Bloomington, Ind., died unexpectedly on March 9. He had been recuperating from an attack of pneumonia and had been released from the Bloomington Hospital a few days previous to his death. A native of Bloomington, Mr. Buskirk was educated at Indiana University and Harvard. In addition to his interests in the stone company, he was vice-president of the First National Bank of Bloomington and the City Loan & Trust Co.

John A. Hoover, vice-president of the Beyer Crusher Rock Company, Kansas City, Mo., was found burned to death under mysterious circumstances in his automobile near that city.

Mr. Hoover had been missing from his home for several days. Robbery was assumed to be the motive of the slaying, as the victim's wallet containing a large sum of money was missing.

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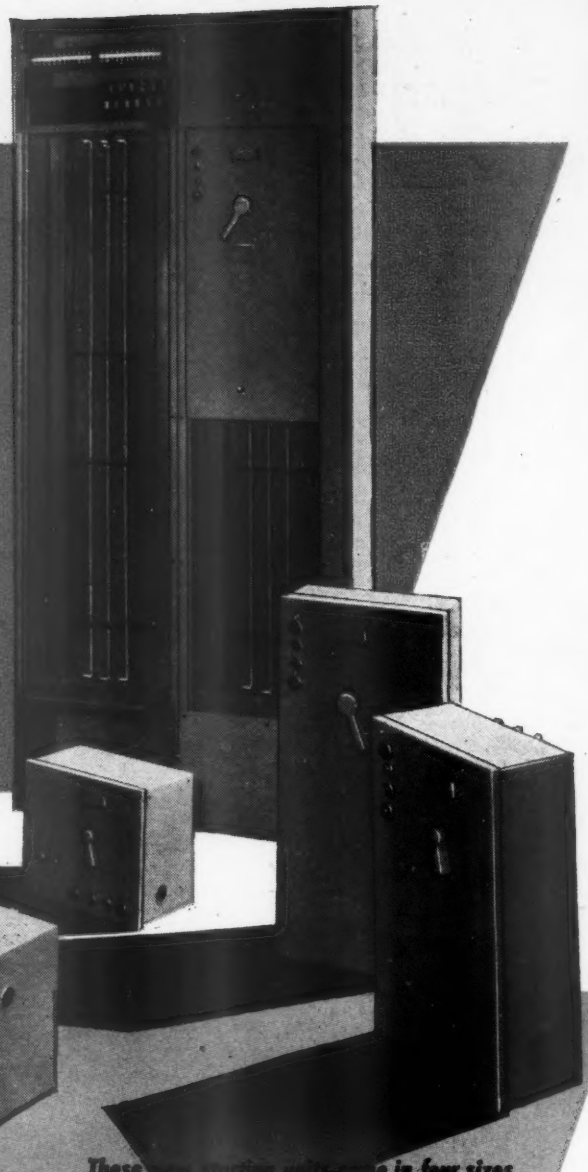

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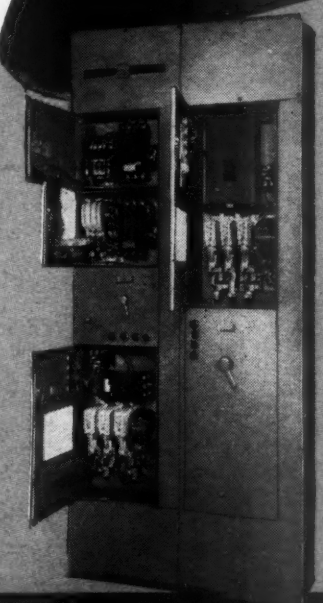

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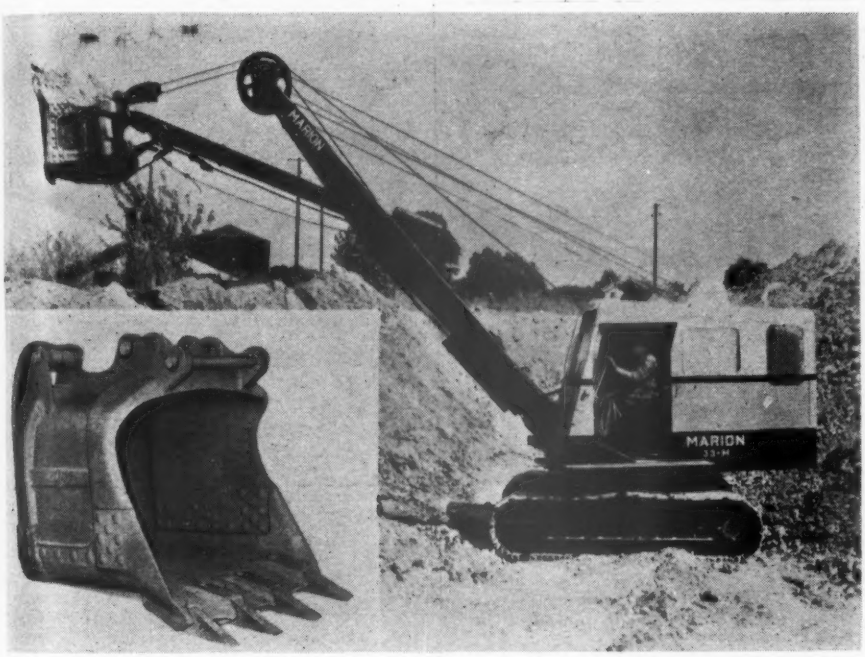


The new 33-M, ¾-cu. yd. shovel recently announced by the Marion Power Shovel Co. of Marion, O., will use as standard equipment the ¾-cu. yd. dipper manufactured by the Pettibone Mulliken Corp.

• Magnetic Separators

A new line of permanent magnetic separators, known as "Perma-Plate" magnets, to remove tramp iron from materials traveling down chutes or through ducts has been developed by Dings Magnetic Separator Company. The magnets are intended for protection of grinders, crushers, stokers, pulverizers and other machinery susceptible to damage by iron.

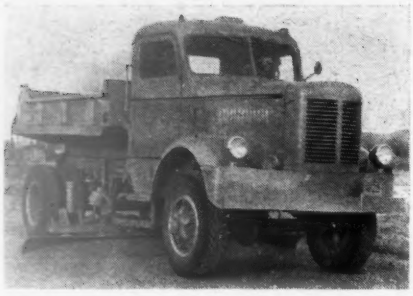
Perma-Plate magnets consist of a series of "C" shaped Alnico magnets, the poles of which are secured to steel plates and the entire assembly is mounted on an aluminum plate. Installation is made by cutting away a section of the bottom of the chute and installing the magnet in its place. It is mounted on hinges, so that it can be swung away for removal of collected iron. The steel pole plates project up from the face of the magnet, providing edges which help mechanically to arrest and hold the iron. Standard units are available in a range of sizes 4 to 72 in. wide in increments of two inches. Special magnets can be built to suit requirements. The manufacturer guarantees magnetic permanence of the Alnico magnets for the life of the unit. Dings Magnetic Separator Co., 4740 W. McGeogh Ave., Milwaukee 14, Wis.

• New Filter

Fram Corporation offers a filter engineered for use where pump pressure is lacking or insufficient. It is recommended by the company for safe, efficient and economical filtration of hydraulic oils, domestic and diesel fuel oils (No. 1, No. 2 and No. 3), trichlorethylene, and oil base coolants. (Not suitable for use with aqueous solutions.)

Fram FMP224-PB2 is furnished complete, ready for immediate installation. It may be installed permanently or moved from one location to another. The filter body is constructed of heavy steel tubing with welded spuds to insure leak-proof construction. The unit consists of the filter with gauge (No. 0-100), relief valve (No. 0-100), and motor and pump, which are strap-mounted to the body. The BF-244 stand (as illustrated) is furnished.

Specifications: Height of filter mounted in stand 39 inches, without stand 36 inches; floor space, 9 inches by 16 inches; weight (dry), 140 lbs.; pump (gear type), 600 r.p.m.; capacity, 3 g.p.m.; standard ¼ hp. motor, 60 cycles, single-phase, 110/220 volts. Price and delivery on motors of other specifications will be quoted upon request. Head room of 16 inches is required for removal of cartridges.



The new 1948 F.W.D. "Maintainer", latest in the standardized line of F.W.D. trucks, has been announced by the Four Wheel Drive Auto Company. It is a standard model in the company's "H" series, and is designated the HG. It has a gross rating of 20,000 lbs. and a chassis weight of 8,000 lbs. Standard wheelbase is 154 inches.

● Non-Electric Separator

Operating and design characteristics of the Eriez "Giant" magnet makes it the first permanent non-electric magnetic separator adaptable for general use in the rock and cinder products industry.

Newly designed Alnico castings provide a deep, constant, uniform magnetic field which will remove tramp iron from heavy, free-flowing material flows. Special face plates are built of abrasive-resistant steel and are furnished in either flat or stepped pole face. The face plate required depends upon the application and the size of tramp iron to be removed.

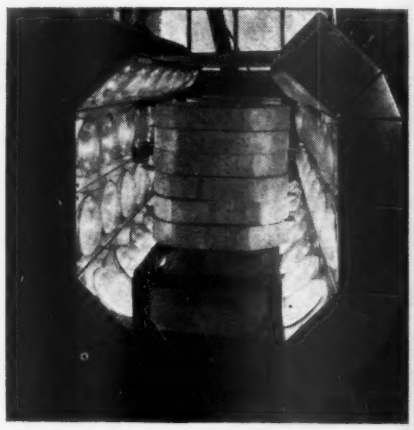
Two models are available. One is for stationary installation in open chutes, while the other, equipped with hinges and latches, is recommended for enclosed chutes. Hinges permit the unit to be swung down for easy cleaning. Both models are fully insulated to prevent magnetic leakage, which allows direct installation on steel.

Typical applications are found in gravity-flow chutes preceding crushing equipment, on chutes or hoppers feeding secondary crushers or grinders and following overloaded magnetic head pulleys or suspended lifting magnets.

No wiring, current or electrical accessories are required. The device is not affected by water or wet materials, and is said to give uninterrupted protection in temperatures up to 600 deg.

● Brake Shoe Bonding Unit

The "Mileybonder," a product of L. J. Miley Co., Inc., is an infra-red unit employing the Mileybond process of attaching Miley Black Gold brake linings



to brake shoes without rivets. It is offered in three capacities—the No. 64, which bonds approximately 24 sets of brake shoes per hour, the No. 32, and the No. 8. The company also furnishes the necessary clamps, bands, resin and shoes—all parts needed for the process.

Advantages cited by the manufacturer include the elimination of a warm-up period and the need for constant operation. The time of cure varies from 8 to 12 minutes. The unit operates under a 20-kw. load wired for 220-volt, 3-phase, 60-cycle current. Switch boxes, end baffles and a welded stand for the oven are furnished.

● Safety Cable

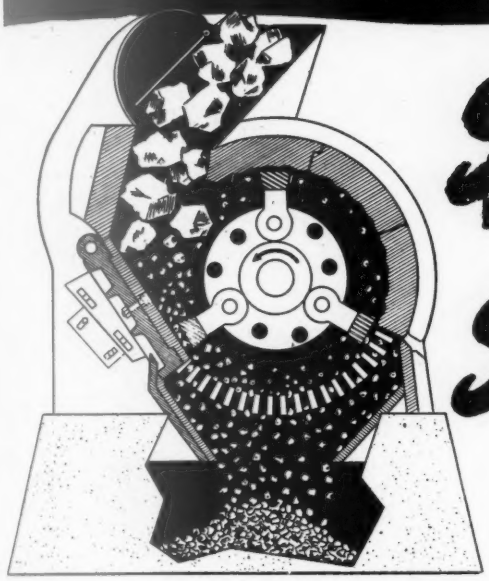
Yellow electrical cable which can be seen plainly in mines has been developed by United States Rubber Co. to increase mine safety.

The cable will be made in various sizes for use on cutters, loaders, drills, locomotives and other mining equipment.

The yellow jacket will enable miners to see the wire and keep it out of danger more easily.

Sparks resulting from damaged electrical wire form one of the leading causes of mine explosions. The yellow cover is the second development completed recently by U. S. Rubber to reduce this hazard. The other development is a special cable which automatically switches the power off and thereby prevents sparks in the event the cable becomes crushed under a mine car.

DAY PULVERIZER-CRUSHER



Shatters MAN-SIZE STONE IN Seconds!

This sectional view of the down-running DAY swing hammer Pulverizer-Crusher manufactured by Brooks shows how most of the reduction is done before the rock reaches the grate bars.

● Hundreds of users all over the world report that dollar for dollar their DAY Pulverizer-Crusher outlives and outproduces other machines of this type because — (1) it's faster — designed to completely shatter man size stone in a matter of seconds . . . up to 75 tons per hour capacity, — (2) it's heavier — extra sturdy, massive and compact, and yet — (3) it is more readily accessible because of its simple design. Other advantages include extra take-up holes, interchangeable manganese steel side liners, reversible swing hammers, reversible screen bars, reversible rotor and many other maintenance-saving features.

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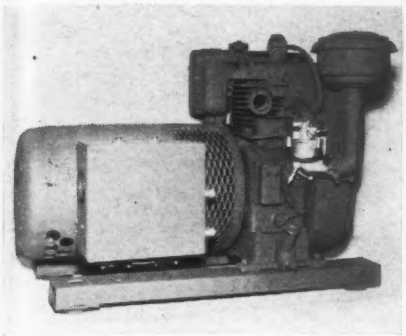
● Lighting Plant

The new 1,000-watt "Katolight" lighting plant, a product of the Kato Engineering Company, is powered with a completely new engine. Although it has only



a 2⅝- by 2⅝-in. bore and stroke, it develops 2.6 hp. at 1800 r.p.m. It is claimed that the governor is so sensitive that it holds frequency within less than one cycle variation between partial load and full load. It is furnished with a built-in automatic choke mechanically operated.

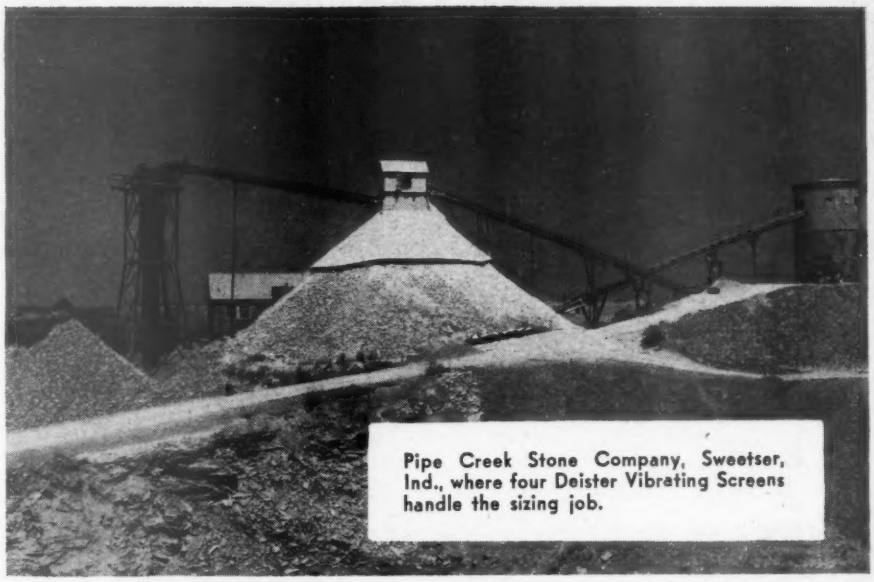
Possibly one of the most desirable features of this new engine is the accessibility of the ignition contact points. The breaker points are mounted outside the crank case beside the carburetor. It is not necessary to remove the flywheel to service the breaker points. The engine runs on shielded ball bearings.

The magnematic ignition system is composed of the following parts: an improved spark at starting speed; breaker points, condenser, radio-shielded stop switch and ground wire; a terminal mounted in a box on the outside of the crank case; Alnico permanent magnets; a molded waterproof coil. The spark advance on the cam shaft automatically retards the spark at starting speed and advances it as the engine speed increases. Spark plug—14 mm.

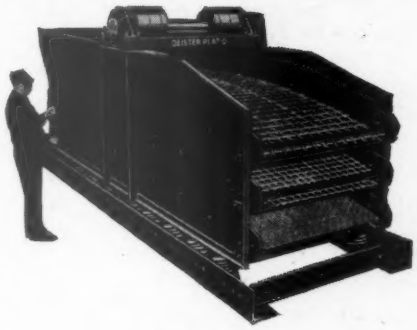
The unit is available with a gravity carburetor with one-gallon fuel tank, or it can be furnished with a mechanically operated fuel pump. The ignition system and spark plug are completely shielded.

This plant is available with remote control or for automatic control. It will produce a constant source of standard a.-c. current (the same as highline), either for standby purposes or as the sole source of supply. Standard automobile batteries are used when self cranking is desired. The generator set does not have to be bolted to the foundation. It is equipped with rubber mounts which tend to reduce the transfer of vibrations. This new engine runs more quietly than many other single-cylinder engines of the air-cooled type. An improved carburetor permits lower fuel consumption. Katolight is in production, and fairly prompt shipments are now being made.

Harold N. Propp, sales engineer for Nordberg Manufacturing Co., has been transferred to the San Francisco district office, effective April 1. He will assist T. D. Davis, manager of Nordberg's Crusher and Process Machinery Divisions in that district.



Pipe Creek Stone Company, Sweetser, Ind., where four Deister Vibrating Screens handle the sizing job.



Four DEISTER Screens ...1800 Tons per Day

Four Deister Vibrating Screens are producing up to 1800 tons per day at the Pipe Creek Stone Company, Sweetser, Ind. — one of several plants operated by Irving Brothers. In operation 24 hours daily during peak periods, the plant produces all sizes of material from agricultural limestone up.

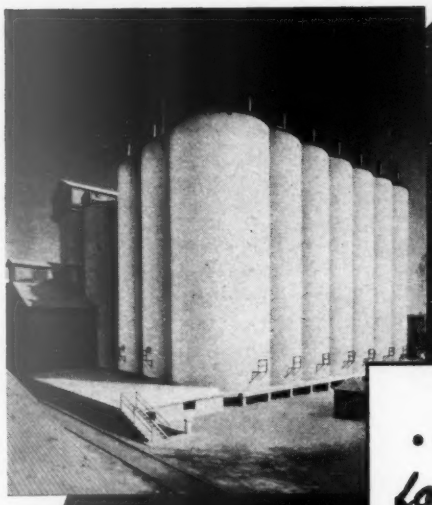
F. W. Irving, manager of the Pipe Creek plant, says the firm has operated Deister Screens since 1931. All screens are still in operation . . . still taking a tough pounding hour after hour . . . still producing aggregates in a wide range of sizes, accurately and cheaply.

The Irving Brothers prefer Deister Vibrating Screens because they run longer with less trouble . . . they are among the many who have found it more profitable to standardize on Deister Screens. For complete information on how Deister Vibrating Screens grade better without overloading . . . give you higher capacity with lower maintenance costs . . . write the Deister Machine Company for your copy of "Better Sizing Cheaper".

DEISTER
SCREENS

DEISTER MACHINE CO.
FORT WAYNE 4, INDIANA

STORAGE BINS



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Need we say more? These two statements sum up the policy of The Nicholson Company in connection with Concrete Storage Bins. Design and construction of concrete storage bins with complete material conveying systems has been the Nicholson specialty since 1914 . . . much of this work not only *for* but made possible *by* the cement and aggregates fields.

It will be our pleasure to serve you in connection with the storage and handling facilities you require.

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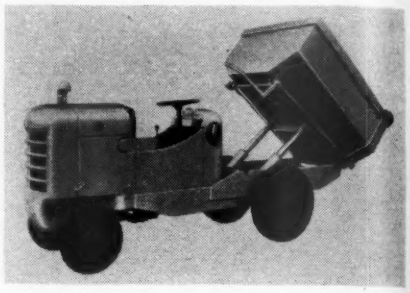
● Gas Engine Buggy

The Frank G. Hough Co. has announced a new addition to its line of material-handling equipment, the "Payloader" buggy. It is a gasoline-engine-powered, four-wheel hauling unit of 2-cu.



yd. capacity, with hydraulically-dumped body. The pneumatic-tire-mounted buggy is designed to provide low-cost, high-production movement of bulk materials in and around plants and yards over longer hauls than are practicable with any type of tractor shovel or loader. Built as a companion to the Payloader shovel, the Payloader buggy matches it in capacity, compact size, speeds and operation. In addition, all main parts of the buggy are interchangeable with those of the Model HA shovel, an important service economy feature.

The Payloader buggy is built low and compact, with a short wheel base and rear-wheel steer, so that it can operate in congested low head-room areas and through narrow doorways and aisles. Overall height is only 5 feet 8 inches. Large wheels with ground-gripping pneumatic tires permit operation on paved or unpaved surfaces; hydraulic brakes, plus full visibility in every direction, cited as valuable safety factors.

The 2-cu. yd. steel body is long, low and wide to facilitate loading by payloaders, cranes, tractor shovels or by hand. It can be used to carry sand, slag castings, coal, cinders, gravel, concrete or any other bulk material. A selection of two forward and two reverse speeds are provided for continuous high output. The Frank G. Hough Co., 801-Z Sunnyside Ave., Libertyville, Ill.

● Impact Breaker

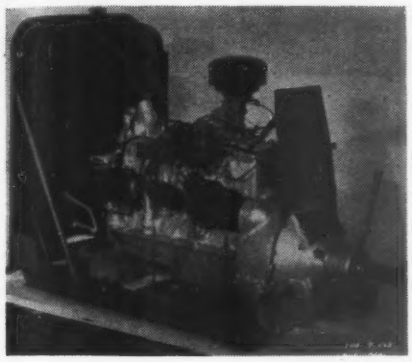
Construction of an experimental model of a supersize double impeller impact breaker is announced by the New Holland Manufacturing Co., Mountville, Pa., a division of the New Holland Machine Co.

This super-size double impeller impact breaker is designed to produce aggregate in two sizes, minus 8 and minus 3½ inches. Two impellers, which strike the stone in mid-air as it falls within the breaking chamber, will weigh 13,400 lbs. each, with bars. Rotating in opposite directions, the impellers will be capable of a maximum speed of 785 r.p.m. It is estimated that each impeller will require a separate power unit capable of producing 100 to 125 hp.

The Model 5050 will be 14 ft. by 14 ft. in height and length and slightly over 9 ft. wide. Mounted on 18-in. I-beam skids 20 ft. long, the breaker will weigh 93,500 lbs.

• Gasoline Engine

The Chrysler Corp. "Ind. 7" gasoline engine is constructed in both a truck type housing, with down exhaust, and an S. A. E. No. 4 housing, with front up exhaust. Bore is 3 7/16 in. and stroke 4¼ in. Cubic displacement measures 236.6 in. As on all Chrysler industrial engines, four piston rings, two compression and two control are used. To decrease bore wear the top compression



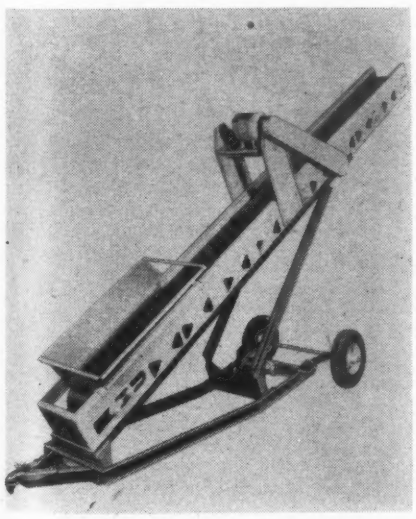
ring is chrome. Pistons are available in cast iron or aluminum. Sodium-cooled valves give a high rate of heat dissipation.

Oil is pressure-forced to all vital parts of the engine by a rotor type pump operating from the crankshaft. Clean oil is drawn from the top of the oil in the pan through a strainer, then forced through an oil filter before going to the engine. Chrysler Corp., Detroit 31, Mich.

• Portable Conveyor

New 14-ft. and 20-ft. portable conveyors have been announced by the Sermat Conveyor Corporation.

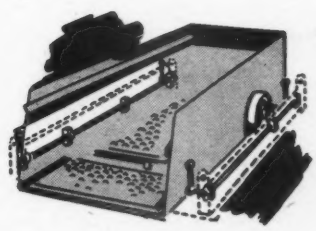
Powered by gas engine or electric motor, the portable conveyors have a tough rubber ply canvas construction belt.



They are designed for handling all bulk materials such as sand, gravel, coal, chemicals, etc.

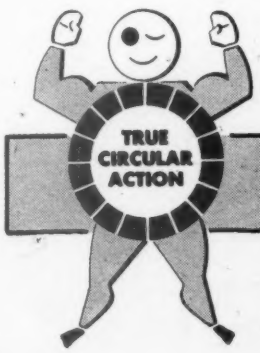
A hydraulic lift raises the "Serva-Belt" to any position from level to 37 inches. It is equipped with 4.00 x 8 pneumatic tires and automobile-type springs. 6.00 x 16 tires are optional.

NO SHAKY TIPPLES with SECO VIBRATING SCREENS



Smooth, efficient performance! That's what operators report with Seco Vibrating Screens. Note in the small illustration (outlined) Seco's Patented Equalizer Assembly. This sets up full control of the true circular action, under all load conditions. There's no bobbing or weaving—nothing to slow down the load. Just smooth, trouble-free screening! Get the whole Seco story! Prompt deliveries now being made.

Write Dept. L for A Guide to Better Screening



SECO

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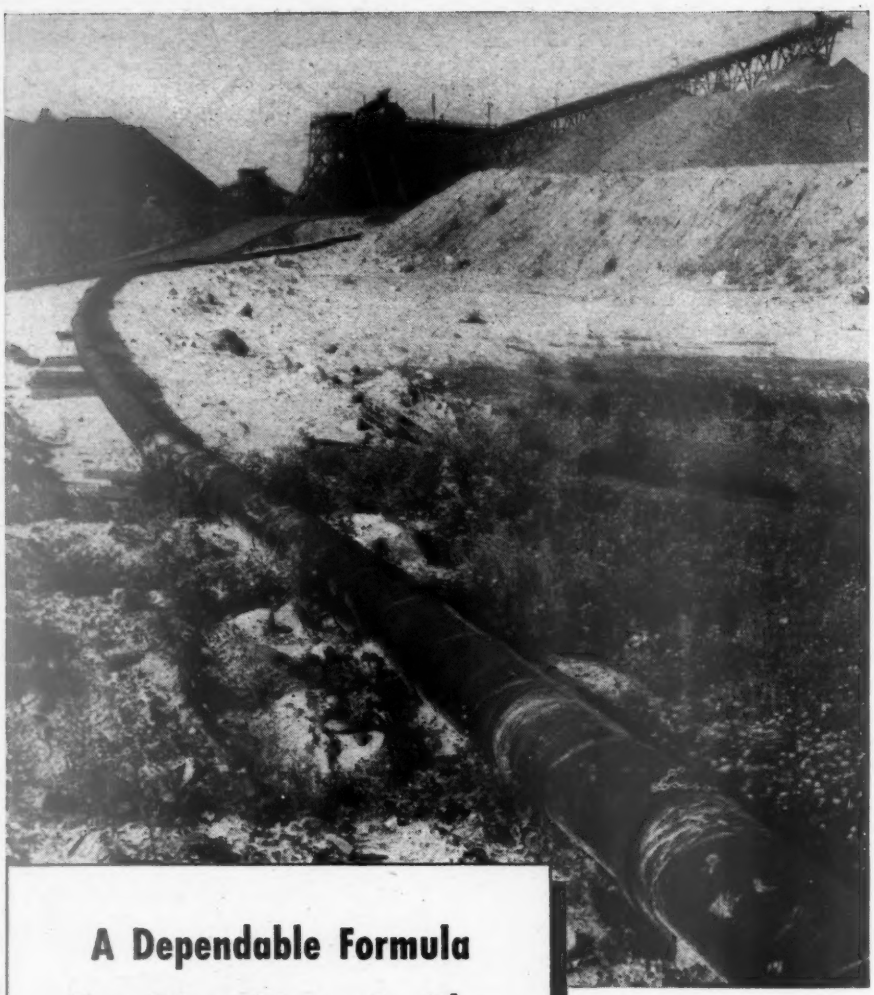
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto



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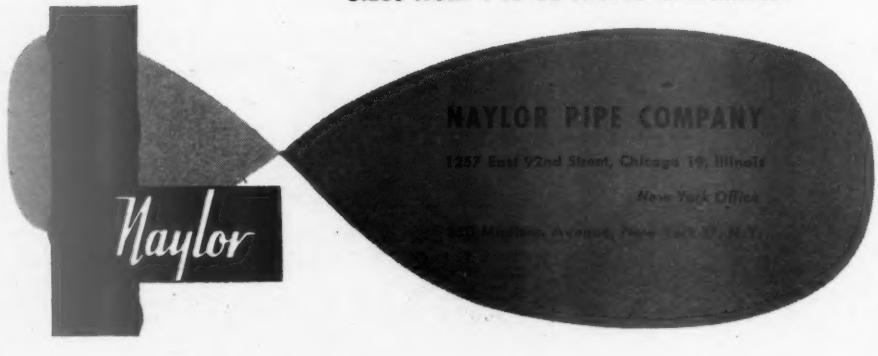


● Clevis Grab Hook

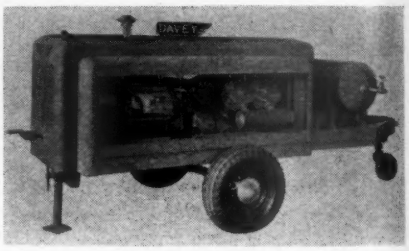
The Thomas Laughlin Co., Portland, Me., has marketed a new clevis grab hook which is said to be quickly attached to or detached from the chain and easily switched from job to job.

The clevis grab hook is attached by merely slipping the clevis pin into place, spreading the cotter. This replaces shackling, cold-shutting, cutting, bending and re-welding the chain. No additional fittings of any kind are needed. All parts are drop-forged and heat-treated for maximum strength and safety.

● Portable Compressor

Addition of a 160 c.f.m. 2-wheel trailer unit to its 1948 compressor line is announced by the Davey Compressor Co., Kent. O.

The new unit will feature a 4-cylinder Davey V-type compressor and will be



known as "Air Chief Model 160—2 wheel." Chassis balance will provide for the same handling ease that is possible with 2-wheel trailers of smaller capacity, according to the manufacturer.

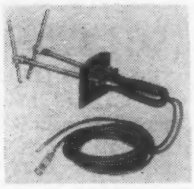
● Apron Feeder

A new model apron feeder, designed to

give trouble-free feeding, has been introduced by the New Holland Manufacturing Co., Mountville, Pa., a Division of the New Holland Machine Co.

The Model 30 has a new multi-plane throat that is said to prevent time-wasting jams.

● Arc Torch



The Lincoln Electric Company is producing a new low price carbon arc torch for use with welding machines. The torch is of rugged, lightweight construction, designed to extend the use of welding equipment to jobs where the application of heat is desired without melting the metal being worked on.

With the arc torch a high-temperature flame is produced between two copper-coated carbon electrodes clamped in aluminum alloy jaws. To operate, the carbons are brought together to produce the arc, then the proper flame is automatically obtained by reversing one of the thumb tabs until the gears lock.

The carbon holder jaws are fitted with either a 5/16- or ⅜-in. diameter carbon without adapters, or with special extra jaws. The handle is made of thermal plastic. With a welder the arc torch can be used for all types of brazing and soldering work, general heating, as well as hard surfacing of thin materials.

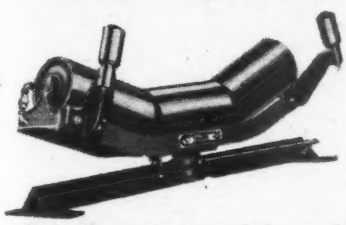
● Light-Duty Hoist

The Yale & Towne Manufacturing Company is manufacturing a new line of low-cost, low-capacity, wire rope hoists designed to bring the advantages of cable and drum hoisting to a wider industry group. The new light-duty hoist will be known as the "Load King," and will be available in ¼, ½, and 1-ton capacities.

The frame of the portable hoist is a heavy, one-piece, ribbed-steel casting, constructed for use with lug, plain trolley, motor trolley, or winch-type mounting. The quick-lifting hoist is equipped with a large-diameter drum with machine-cut grooves for guiding the cable as it winds. The drum has sufficient capacity to provide for full standard lift without overlapping of cable. Yale & Towne Manufacturing Company, Philadelphia Division, 4530 Tacony Street, Philadelphia 24, Pa.

● Self-Aligning Idler

A new, patented self-aligning belt conveyor idler has been announced by The Continental Gin Co., Industrial Division. It is made in designs suitable for



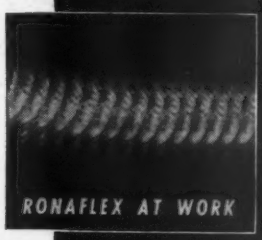
troughed, flat and return belts, and the units are interchangeable with practically all standard idlers.

Construction features include heavy-duty Timken bearings on the 1¼ in. swivel shaft. All grease pipes extended to one side for ease and safety of lubrication; hydraulic fittings are standard equipment, with others offered, if required.

VIBRATION ABSORBED!

. . . another production problem solved by Ronaflex

Using a 1-inch rigid pipe to connect a Curtis compressor to a wall pressure tank, this company was faced with a serious vibration problem. With the compressor in operation, the iron pipe, carrying an air pressure of 175 p.s.i. shook the partition so violently that the vibration threatened to demolish it. In addition, the noise was terrific.



Ronaflex 1½" flexible tubing replaced the rigid pipe. Mr. A. Olsen, factory superintendent, states: "Ronaflex has eliminated 90% of the vibration and noise. Maintenance on the compressor has been reduced. Ronaflex snap-on couplings made installation easy . . . and save valuable time and manpower when compressor-servicing is required."

Lightweight, tough, low-cost Ronaflex Flexible Tubing can replace rigid pipe, as well as flexible all-metal tubing, to increase production, cut costs in your plant as it has done in many others. Our engineers stand ready to show you how Ronaflex assemblies can more effectively transport steam, petroleum products, chemicals, gases, or fluids. Call on us.

Write today for complete data

RONAFLEX TUBING CO., INC.

PACKARD BUILDING, PHILADELPHIA 2, PA.

Actual photograph of Ronaflex Tubing installed in 175 p.s.i. air line between Curtis air compressor and tank at the plant of W. H. & L. D. Betz, Chemical Engineers and Consultants on all water problems, Frankford, Philadelphia, Pa.

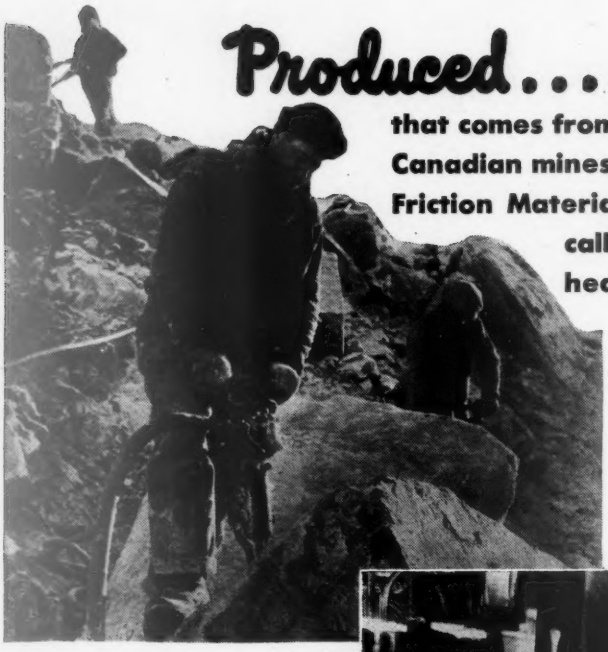
This is Ronaflex:

TOUGH AND RUGGED
resists abrasion, heat, aging

DURABLE
resists deterioration by fluids or gases, chemicals, oils, solvents

LIGHTWEIGHT BUT STRONG
high tensile strength, resilient.

YOUR ORDER IS SHIPPED WITHIN 72 HOURS



Produced . . . from asbestos that comes from J-M's own Canadian mines, Johns-Manville Friction Materials are mechanically strong, highly heat-resistant.

Tested .. in the famous J-M Research Laboratories under actual field conditions.

Specified .. by the leaders in industry everywhere!

FROM raw material to finished product, Johns-Manville controls the quality of J-M Industrial Friction Materials. That's why the highly trained buyers of most leading industrial equipment manufacturers have *standardized* on "Johns-Manville."

Stay with Johns-Manville and you're sure of the best! Contact your nearest J-M Distributor for help in selecting the proper style of J-M Friction Material . . . or write to Johns-Manville, Box 290, New York 16, N. Y.

JM PRODUCT

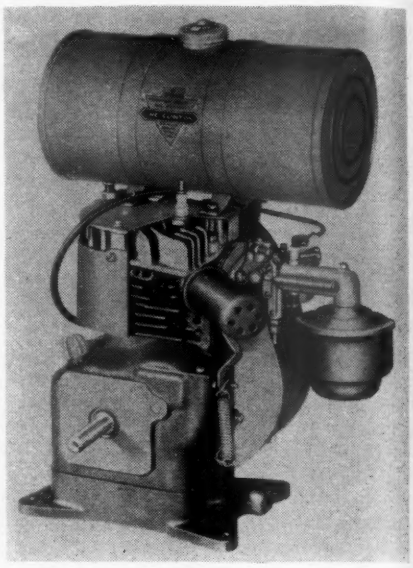
Johns-Manville

INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

● Lightweight Engine

A new precision-built Clinton engine, known as "Series 1100," which has been under development for three years, has been released following tests under all types of operating conditions. Pilot

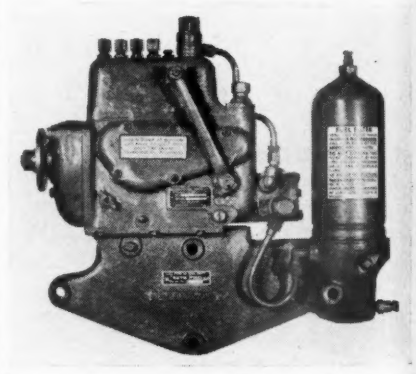


models were run 24 hours a day for months.

Its light weight, approximately 47 pounds, gives it a wider range of applications for portable equipment. Various bases are available for special mounting on different types of equipment. The oil filler is conveniently located on top of the crank case. Clinton Machine Co., Clinton, Mich.

● Replacement Pump Package

The Industrial Power Division of the International Harvester Co. announces a field replacement package unit containing a new single-plunger International Diesel fuel injection pump for replacing the

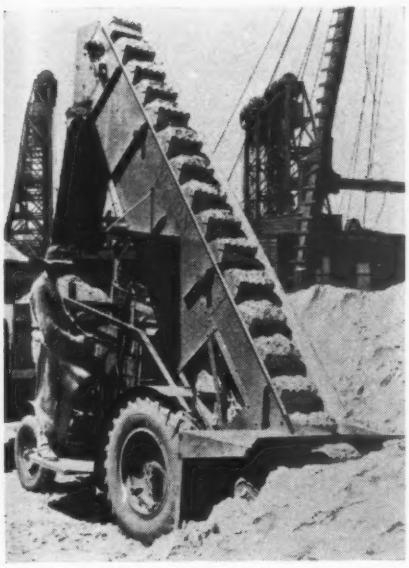


older four-plunger pumps found on series "35" and series "40" diesel engines. New high-pressure fuel lines and all necessary accessories are included. No modifications are required to install the new unit. Cost of the unit is less than the expense of a major overhaul on the old pump.

Features of the new single-plunger pump include faster governor action and more accurate fuel metering and injection. These features result in smoother engine operation and increased engine torque for maintaining constant r.p.m. under intermittent load conditions.

● Bucket Loader

The "K-5" bucket loader, built heavily enough for pit and road work yet quickly maneuverable in busy yards, is a new development of the N. P. Nelson Iron Works, Clifton, N. J. The unit is equipped with a two-strand elevator and

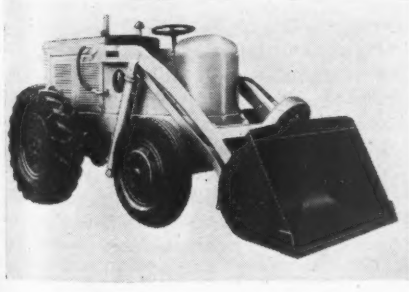


four-speed transmission. Separate Twin Disc clutches control traction and elevator, the latter having an automatic overload release to prevent damage to the machine.

Feeder spirals loosen the material and heap it into buckets at speeds up to 2 yd. a minute. The K-5 handles earth, gravel, or broken stone up to 2½-in. size. It moves under its own power over short distances and is equipped with self-steering tow bar for towing between more widely scattered jobs. Power unit is a 27-hp. gasoline engine.

● Tractor Shovel

The Frank G. Hough Co., Libertyville, Ill., announces an important improvement in its Model HF ¾-cu. yd. "Payloader" tractor shovel. Previously equipped with hydraulic lift and lowering of the bucket, the machine now has the added feature of hydraulic bucket control which dumps and closes the bucket by fingertip-actuated hydraulic power. Bucket can be dumped gradually or instantaneously as desired and can be closed immediately by the same hydraulic cylinder. This feature increases the speed and ease of operation because the bucket need not be dropped to the ground and the tractor reversed to close it. It also relieves the machine and the trucks being loaded of dumping shock and wear and tear.



Here's a

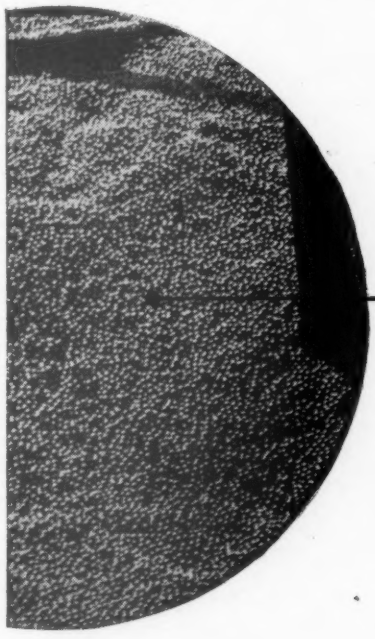
two-fisted way

to get better grinding results

U·S·S LORAIN ROLLED PLATE LININGS

In all sorts of grinding, U·S·S Lorain Rolled Plate Linings are helping to establish new performance records. They are setting new highs in lining life. Cutting maintenance costs. Keeping the number of replacements down to the minimum.

These linings are rugged and durable. They are adaptable to any mill, in the diameter, length or thickness required. Because they have been designed for quick, easy handling, they speed up installation time. Available through leading grinding mill manufacturers whose names will be furnished on request.



U·S·S LORAIN GRINDING BALLS

Forged from special analysis steel and accurately heat-treated to take the punishment of the longest, heaviest runs, these grinding balls maintain a standard of quality that insures uniformly superior results. Available in all sizes from ¾" to 5" in diameter.

USS STEEL — UNITED STATES STEEL

CARNEGIE-ILLINOIS STEEL CORPORATION

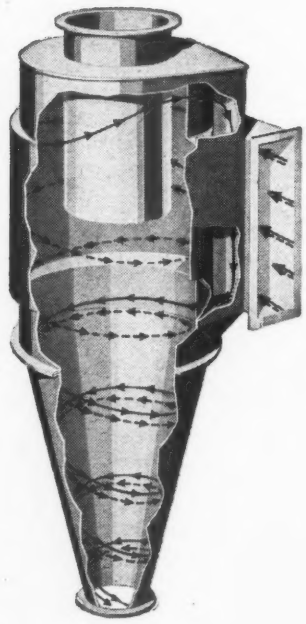
Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

8-196

UNITED STATES STEEL

WHAT'S THE ACTUAL COST OF Dust RECOVERY?



Accurate reckoning

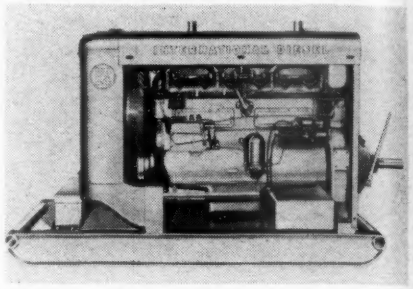
naturally must include long-range operation and maintenance costs. A good number of Buell installations, in a wide range of industrial uses, have been serving for 10 years with next to no maintenance. Operating costs are low with mechanical simplicity; no moving parts. Buell design eliminates plugging. And efficiency is high, because of the patented van Tongeren 'shave-off'. The Buell dust recovery system may mean real economy to you. Skim the facts or study the details in the new 32-page catalog. Write: Buell Engineering Company, 12 Cedar Street, Suite 5000, New York 5, N. Y.

buell

Engineered Efficiency in DUST RECOVERY

● Engine and Power Unit

The UD-24 diesel engine and power unit is another development by International Harvester during the past year. It is of a four-cycle valve-in-head design, with a compression ratio of 15.2 to 1. Its horsepower at the rated r.p.m. of 1375 is 192 (engine) and 180 (power unit). Maxim torque (pounds-feet) is 763 and



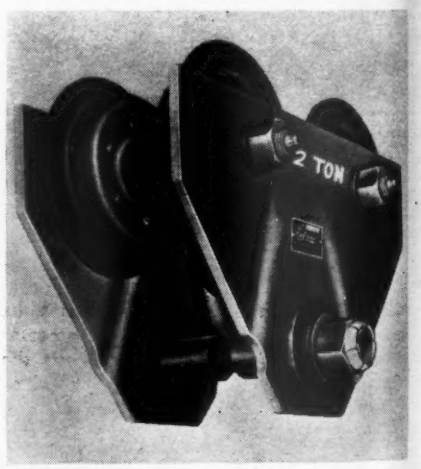
743 respectively. Engine r.p.m. at maxim torque is 800.

Cylinder pressures are controlled by precombustion chambers, giving smooth idling and maxim power with a clean exhaust on a wide variety of low-cost fuels. Element fuel and oil filters are of the radial fin type. A V-belt driven, positive centrifugal pump with full floating shaft circulates a large volume of collant through the cylinder head jackets and around the full length of the cylinders. Main and connecting rods and cylinder sleeves are heat treated to file hardness and are replaceable with identical service parts. International Harvester Co., Chicago 1, Ill.

● Hoist Trolley

Complementing a diversified line of wheels, casters and conveyor parts, Saginaw Products Corporation introduces a new chain hoist trolley for use on I-beam overhead conveyor installations.

Wheels are made of a heavy strip steel, carefully carburized and hardened. Stand-

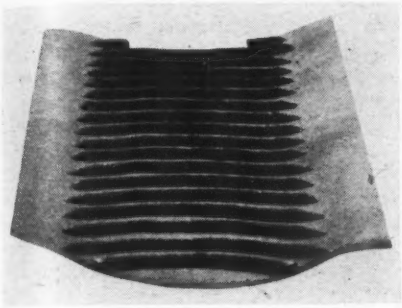


ard grease fittings are supplied for positive pressure-gun lubrication. Heavy sideplates extend past the wheels, acting as bumpers, and are self aligning to distribute the load equally on all four wheels. The two halves of the trolley are adjustable to permit mounting at any point on the I-beam; spacing washers insure exact adjustment on I-beams from 3 to 18 inches.

• Ribbed Conveyor Belt

A new ribbed-top conveyor belt designed especially to prevent backslip in carrying sand and gravel, ready-mixed concrete and other soupy materials up steep inclines, has been developed by the Goodyear Tire & Rubber Company.

The new belt features chevron-shaped



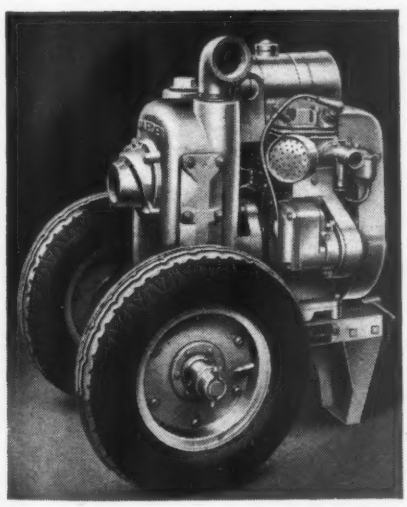
ribs one-quarter inch higher than the belt surface. The ribs serve as barriers, trapping the water and preventing the backwash of materials down the belt.

It is claimed that the ribbed belt eliminates any noticeable back-slipping of most wet materials on inclines up to a 20-degree angle.

The new belt has a five-ply rubberized fabric body and a ¼-in top cover in addition to the ribs. It is being made in widths of 30 to 48 inches, and in lengths to customers' specifications.

• Portable High Pressure Pump

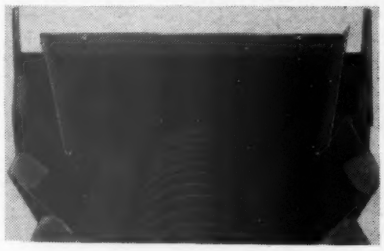
Answering the demand for a compact, completely self-contained and easily transported pumping unit the Jaeger Machine Company offers its 2-in. portable pressure pump, "Model 2PAFH." This gasoline-



engine-driven unit weighs only 150 pounds, including pneumatic tires, mounting frame and telescoping towing pole.

At 10-feet suction lift, this pump has a range of volumes and pressures from 135 g.p.m. at 10 pounds discharge pressure, to 30 g.p.m. at 60 pounds discharge pressure, and a maximum shutoff pressure of 70 pounds.

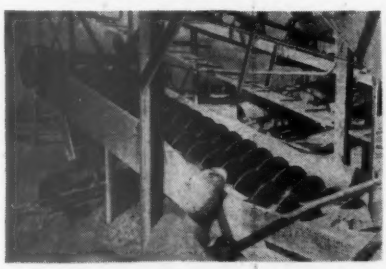
Construction of the pump proper is simple and rugged. The open-bladed or trash-type impeller combines high pumping efficiency with ability to handle large solids.



Top: Water discharge end of Eagle Double Screw Washer-Classifier-Dehydrator showing adjustable weir lips and feed box.

Bottom: Single Screw unit with right weir lip up. Water discharge flows only over left and end lips.

Perforated Screw flights permit water trapped by screw to flow back down to lower discharge . . . improves dehydration.



Eagle Double Screw unit in production removes lime dust and silt from material at a Florida plant.

EAGLE

LONG WEIR

Fine Material

Washer-Classifier-Dehydrator

Control fine material classification COMPLETELY with the Eagle Long Weir. Reject or retain fines at will be adjusting the sectional weir and altering the wash water feed. U-shaped weir is three times longer for minimum head, lower water discharge velocity, and maximum retention of fines. Raising one or more weir lips, as shown at left, shortens usable weir length, increases head and discharge velocity, and throws coarser mesh material into overflow.

The new Eagle Feed Box, with built in baffle, assures exact point of material feed-in and reduces turbulence in tub. Perforated flights are provided above the water line for additional draining. Eagles are handling material as fine as 350 mesh and effecting dehydration to 10-12% moisture content by weight.

Eagle Washer-Classifier-Dehydrators—like Eagle Washer-Dewaterers and Log Washers for coarse material—feature replaceable, sectional flights and long-life bearings. In all units a constant rising column of wash water, introduced through a multiplicity of small holes in the tub bottom, carries trash and excess fines up through material bed and back to lower discharge. Send for Sand and Gravel Catalog 47.

SINCE 1872
Progress...Service

Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS

EAGLE IRON WORKS

133 Holcomb Ave. • Des Moines, Iowa

trade notes

The newly-constructed kraft paper mill of the Alabama Pulp & Paper Company at Pensacola, Fla., a wholly-owned subsidiary of the St. Regis Paper Company, has recently gone into operation, according to James H. Allen, president of the Alabama company and a director of St. Regis. The mill, with a rated capacity of 250 tons a day, has been built on a site adjacent to the company's Florida Pulp & Paper mill and will supply kraft paper to the new multiwall bag plant.

Load-packing HUSKY!...

that CINCINNATI CONVEYOR BELT

These outstanding features make "Cincinnati" today's conveying "champ":

1 LONG LIFE COVER. - "Cincinnati" toughness builds up tonnage records.

2 FASTENER-HOLDING CARCASS. - "Cincinnati" construction lets fasteners get a never-let-go grip.

3 REINFORCED EDGES. - fortify a "Cincinnati" against scraping and gouging.

4 INSEPARABLE PLIES. - Plies of duck and rubber are practically welded into one piece.

Let a "Cincinnati" HUSKY pack the load . . . get one on the job today.

CINCINNATI RUBBER MFG. CO.
Cincinnati 12, Ohio

CINCINNATI RUBBER

Louis E. Wettlaufer, 76, former president of the Niagara Concrete Mixer Co., Buffalo, died recently at his home at Windmill Point, Ont., after an extended illness. He was born in Canada in 1871. He retired from business several years ago due to illness.

Appointment of C. W. Myers as divisional field engineer in charge of sales and service in Texas, Oklahoma, Arkansas, Louisiana and Western Tennessee, was announced by the Davey Compressor Co., Kent, Ohio.

Appointment of Ivan X. Sarvis as assistant general sales manager for Chevrolet was announced by T. H. Keating, general sales manager. Mr. Sarvis was formerly regional manager of the division's Southwest Region, with headquarters at Dallas, and a veteran of more than 20 years in Chevrolet.

Weston G. Frome, general manager of the Atlas Powder Company's explosives department and a member of the board of directors, has been elected a vice-president of the company. He will continue as head of the explosives department and as a member of the board.

Howard L. Phillips has been appointed assistant export manager of Nordberg Manufacturing Co., Milwaukee, Wis., according to an announcement by B. T. Eagerton, export manager.

With a view towards making its complete line of standardized materials handling equipment available to Southern manufacturers, Market Forge Company of Everett, Mass., has appointed Claude C. Mason & Company, Atlanta Ga., as its regional factory sales representative for the Southeastern states. This territory includes Alabama, Arkansas, Georgia, Mississippi, South Carolina, North Carolina, Florida, Louisiana, and Tennessee.

Smith Engineering Works, Milwaukee, Wis., has announced the appointment of Sam A. Madrid as Western representative. He will cover all of the states west of and including Montana, Wyoming, Colorado and New Mexico, and will assist Telsmith dealers with the sale of Telsmith equipment.

E. T. Cuddeback, for the last year sales representative in the Allis-Chalmers Atlanta district office, has been named manager of the company's Tampa district office, according to an announcement by J. L. Singleton, vice-president and director of sales of Allis-Chalmers general machinery division.

The appointment of E. E. Witt as special representative in construction and industrial sales for Caterpillar Tractor Co. in the Western Division has been announced by H. H. Howard, Caterpillar general sales manager. Mr. Witt's headquarters will be in San Leandro, Calif.

E. G. Hartmann

E. George Hartmann has been named general sales manager by the John A. Roebling's Sons Company, Trenton, N. J.

Mr. Hartmann, who brings to his new position over 29 years experience in the wire field, has been associated with the Roebling Company since 1940. Widely known in the industry, he is a member of the Wire Association and the American Iron and Steel Institute.

Robert S. Hammond, vice-president of Whiting Corporation (Chicago district sales office) has announced that, effective May 1, 1948, the new Chicago address will be First National Bank Building, 33 South Clark Street.

Effective May 10, 1948, the new address of the Whiting District Sales Office at Pittsburgh will be Empire Building, 505 Liberty Avenue, Pittsburgh 22, Pennsylvania. H. E. Reynolds will continue as the Pittsburgh district sales manager.

At the annual election of the Traylor Engineering and Manufacturing Company, Allentown, Pa., W. J. Roberts Sr. was re-elected to the office of president for his 31st year. He has been associated with the firm since 1907, and was named president in 1918.

At the same time, officials announced the retirement of W. C. MacDowell, vice-president in charge of sales for the last 25 years. No successor was named to replace Mr. MacDowell. Other directors named at the election included the following: S. W. Traylor Jr., vice-president; C. H. Roberts, vice-president and general manager; J. Mair, secretary and treasurer; W. J. Roberts Jr., assistant treasurer; M. C. Sattler, assistant secretary.

Stockholders of Traylor approved a change in the company's authorized capital stock, to authorize and issue 130,000 shares of common stock with a par value of $650,000. All preferred stock has been retired.

The General Perlite Company, 274 W. Santa Clara Street, Santa Jose, Calif., has prepared literature on the use of processed Perlite for insulation, plaster, concrete aggregate and horticultural use. The company will forward a copy of any or all of the folders gratis to all interested persons, according to an announcement made by J. Fournier, president.

R. R. Tatnall has been appointed field service metallurgist in charge of customer relations for The Colorado Fuel and Iron Corporation, Wickwire Spencer Steel Division. Mr. Tatnall has been connected with the Morgan plant at Worcester, Mass., for 20 years.

David S. Price has been appointed representative for the Brooks Equipment Company in the Great Lakes territory.

"Big Machine"
STAMINA
"Little Machine"
MOBILITY

It's the
NELSON K-5

TOUGH jobs on the road and tight spots in the yard never stymie a Nelson K-5. Watch this nimble loader as it responds sensitively to operator's touch. Here's *toughness* for the pit or road—plus *agility* for the busy yard. Here is that rare combination of ruggedness and flexibility that you've been looking for.

More, a Nelson K-5 is economical to buy and economical to operate. Watch it do hard work the easy Nelson way, "picking before it shovels."

Other features include two-strand elevator . . . Twin Disc clutches . . . four-speed transmission . . . self-steering tow bar for quick, easy movement between scattered jobs.

Use a Nelson K-5 for quicker, lower cost loading. Watch it run circles around bulkier, less responsive machines. Write for details and prices.

NELSON

N. P. NELSON IRON WORKS, INC.
CLIFTON, N. J. • *Truck Loaders Since 1917*

PULVERIZERS

Have you investigated our new BRADLEY HERCULES MILL?
Unquestionably the last word in Economy and Simplicity.

(Send for New Catalog No. 59)

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.

GOODALL "POWER KING" TRANSMISSION BELTING

Custom-built belting with all the strength, grip and durability to guarantee continuous power to your primary or intermediate crushers. Raw edge construction. High quality friction between plies contains skims of pure rubber to provide greater flexibility and prevent "bootlegging." Edges are specially treated to keep out moisture.

Available in all widths up to 48", in 33 oz. and 35 oz. silver duck. Can be made endless if desired.

Contact Our Nearest Branch for Prices.

GOODALL RUBBER CO., INC.

THE GOODALL-WHITEHEAD COMPANIES

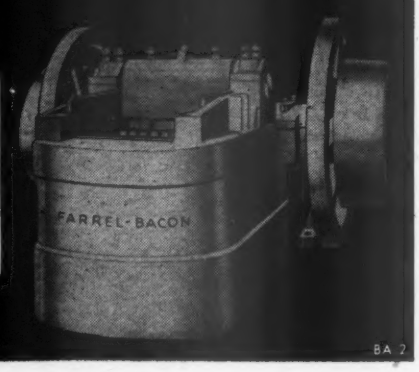
MILLS and EXPORT DIVISION, TRENTON, N. J.—ESTABLISHED 1870

Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • St. Paul • Los Angeles San Francisco • Seattle • Salt Lake City • Houston • Distributors in Other Principal Cities

LONGER PRODUCING LIFE BUILT INTO

FARREL-BACON CRUSHERS

Permanent strength and operating efficiency is engineered into these crushers at every vital point. Farrel-Bacon will provide industrial units or completely designed and equipped plants, including screens, elevators and conveyors. Also other types of mine, quarry, sand and gravel plant machinery. *Write for complete information.*



FARREL-BACON
ANSONIA, CONNECTICUT

BA 2

The Market Forge Company, Garvey Street, Everett 49, Mass., announces the appointment of The Larson Equipment Co., 62 Main Street, Buffalo 2, N. Y., The Charles C. Lewis Co., 401 Liberty St., Springfield, Mass., and The Charles A. Strelinger Co., 149 E. Larned St., Detroit, Mich., as their stocking distributors in these cities.

Appointment of R. G. Carter, former service engineer, as assistant service manager of the Lima Shovel and Crane Division of Lima-Hamilton Corporation, has been announced by J. W. Artz, director, parts sales and service.

Announcement of the appointment of W. D. "Pete" Haley as district manager of the Pacific Northwest territory for the Lima Shovel and Crane Division, Lima-Hamilton Corporation, Lima, O., has been made by P. R. Ehrgott, general sales manager.

M. E. Army, assistant district manager and a veteran employee of the Lima Shovel and Crane Division of Lima-Hamilton Corporation, Lima, O., has his home in Glendale, Calif., on October 31, 1947. Mr. Army joined the Lima-Hamilton organization in 1928 as service engineer.

The Colorado Builders Supply Company Equipment Division, with offices at Denver, Colo., and Scottsbluff, Neb., have been appointed industrial distributors for General Motors Series 71 Diesel engines.

Appointment of C. R. Smith & Sons, Inc., Youngstown, as a Class A dealer is announced by Davey Compressor Co., Kent, O.

L. H. Van Dike Jr. has been appointed by the John A. Roebling's Sons Company, Trenton, N. J., as Detroit representative, replacing the late Harry T. Hirbe, who died on November 24 in his thirty-first year.

Appointment of the Penn Central Equipment Company of Altoona, Pennsylvania, as a distributor of the entire Hewitt Rubber Division's line of industrial hose, conveyor and transmission belting, and packing, was announced by J. H. Hayden, vice-president in charge of sales, Hewitt-Robins Inc.

The Ball & Roller Bearing Division of Link-Belt Company announces the appointment of Arthur E. Maha as assistant sales manager for the Central Division, with headquarters at the Dodge plant, Indianapolis, where the company's ball and roller bearings are made.

Announcement is also made of the appointment of Lewis M. Watkin Jr. as assistant sales manager for ball and roller bearings in the Eastern Division with headquarters in Philadelphia. Both men will report directly to George H. Woody, sales manager, Ball and Roller Bearing Division, Dodge plant, Indianapolis.

R. G. Huntress has been appointed manager of wire rope sales for The California Wire Cloth Corporation, a subsidiary of The Colorado Fuel and Iron Corporation. He will operate out of the Oakland, California office to serve the Pacific coast area.

T. J. Hawthorne was recently appointed district manager for The Euclid Road Machinery Company of Cleveland, O. Mr. Hawthorne will make his headquarters in Denver and has been assigned the states of Colorado, New Mexico and Arizona, as well as sections of Texas and Wyoming.

Link-Belt Company announces that C. C. Wiley, heretofore district sales manager at Birmingham, has been appointed district sales manager at Baltimore, to succeed H. Merrill Bowman. Announcement is also made of the appointment of James T. Bell Jr. as district sales manager at Birmingham, to succeed Mr. Wiley.

Advertising managers and public relations directors of diesel engine manufacturers, met in Chicago on March 19 to discuss topics related to their everyday jobs. The meeting was arranged by the Diesel Engine Manufacturers Association.

Speakers included the following: F. A. Uniack, Cleveland Diesel Engine Division, General Motors Corp.; L. A. Harlow, Fairbanks, Morse & Co.; Delbert Kay, Nordberg Manufacturing Co.; A. L. Davis, Worthington Pump & Machinery Corp.; G. H. Amberg and H. D. Ellis, Diesel Engine Manufacturing Assn.; Dale Cox, International Harvester Co.; Volney B. Fowler, Electro-Motive Division, General Motors Corp.

Link-Belt Company, Atlanta plant, announces the establishment of a district sales office in Jacksonville, Fla. Robert L. Lowder, formerly district sales engineer at the Link-Belt plant in Atlanta, has been appointed district sales manager in charge of the new office.

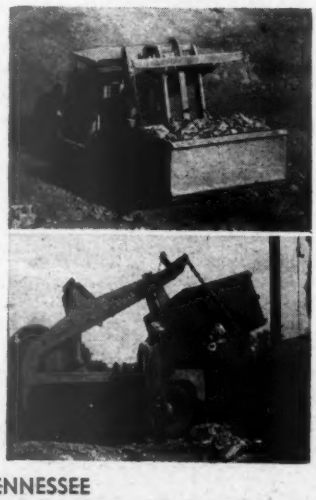
Iron & Steel Products, Inc., Chicago, announce the appointment of Frank M. Sweeny as sales representative in the Baltimore, Md., district with headquarters at Baltimore.

Funeral services for Ralph E. Conder, advertising manger of the Boston Woven Hose & Rubber Company were held Friday, February 20, 1948 at Cambridge, Mass. Mr. Conder was associated with the company for 42 years, and was nationally known in the advertising and mechanical rubber goods fields.

The 1948 Foundry Congress and Show of the American Foundrymen's Association is scheduled to meet at Philadelphia from May 3 to 7, according to an announcement from William W. Maloney, secretary-treasurer.

Which is easier?

You're right! Illustration "A" is the easy way to load rock. It's unnecessary for loading crews to waste energy throwing or shoveling rock up into the high body of a truck. The extra lifting that kills loading crew efficiency is eliminated by the Dempster-Dumpster System which brings the body down to the men. Any number of waist-high bodies are placed where needed, then, as a body is loaded, a truck hoisting unit picks it up, hauls it, dumps it, and returns the empty for reloading (See action pictures at right). There's no wasted time for truck or crews . . . only a continuous cycle of loading and hauling. Cost of installing the Dempster-Dumpster System is amazingly low. Write for catalog 247 today.



DEMPSTER DUMPSTER
TRADE MARK REG.

258 N. KNOX, KNOXVILLE, TENNESSEE

K-P *Engineered* WIRE SCREEN

* SIEVING
* SIZING
* SEPARATING

Korb-Pettit Wire Screen is not only first quality in material and workmanship but is engineered for the job involved. Available in High Carbon Spring Steel and Oil Tempered Spring Steel for extreme abrasion resistance. Designed for all types of vibrators and rotary equipment. Request literature.

Wire Screen,
Spiral Woven Wire
Conveyor Belts,
Wire Partitions,
Machine and Window
Guards, Cages,
Enclosures, Grilles, etc.

KORB-PETTIT
WIRE FABRICS AND IRON WORKS
INCORPORATED
Engineers and Manufacturers
1503 No. Mascher St.
Philadelphia 22, Pa.

"KEEPS PROMISES"

LONGER LIFE

FOR BALL AND ROLLER BEARINGS

Your investment in anti-friction bearings is certainly great enough to warrant your investigating the possible savings to be made through the use of LUBRIPLATE lubricants. They actually preserve bearing surfaces, arrest progressive wear and protect against rust and corrosion. There are LUBRIPLATE lubricants for all speeds, all operating temperatures and conditions. Write for particulars.

Rx FOR YOUR MACHINERY

No. 2 — Ideal for general oil type lubrication, ring oiled bearings, wick feeds, sight feeds and bottle oilers.

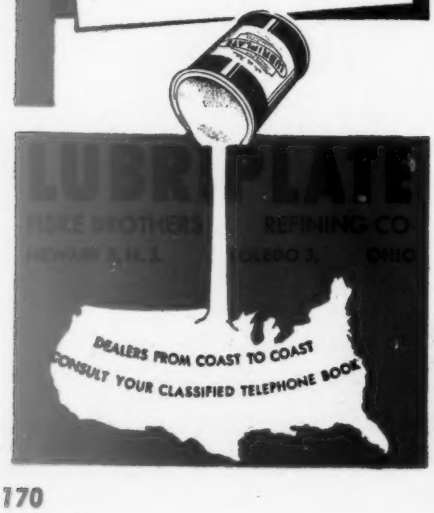
No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107 — One of the most popular grease type products for general application by pressure gun or cups.

No. 70 — For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.


LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J. TOLEDO 3, OHIO
DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK

legal decisions

By LEO T. PARKER

A few days ago a reader brought up a legal point very important to all readers. This person asked: "Is an insurance company liable if it failed to issue a policy with coverage promised by the insurance agent? In his case I told the insurance agent the buildings we wanted to insure in 1945, and now the insurance company refuses to pay loss on a building which burned because the agent neglected to include it in the policy.

The answer to this question is: This reader *cannot* receive *any* payment for loss of the building because he failed to read the policy and *notify* the insurance company that it did not afford the desired protection.

It is well known by all insurance company officials that not one person in each 100 read their insurance policies. But they should read them. Failure to read a policy promptly and discover an error, and then notify the insurance company within a reasonable time that the error exists relieves the company from all liability although its agent promised to insure property or include other clauses which, through error, were omitted from the policy.

However, this general rule of law does *not* apply to ambiguous clauses in insurance policies. All new higher court decisions hold that where an insurance policy contains an ambiguous clause any reasonable doubt as to its meaning will be resolved in *favor* of the insured.

For example, in *Cement, Sand & Gravel Company v. Agricultural Insurance Company*, 30 N. W. (2d) 341, reported February, 1948, it was shown that the cement, sand and gravel company had an insurance policy which insured the company's main building and conveyors, passageways and superstructures and "all other fixtures belonging to and forming part of building and all machinery used in operation of the plant while within 100 feet of the building".

NO SAG NO PULL OUT

With Cleveland Wire Screen Section Assemblies

• Increase your profits and stop tonnage losses with the specially prepared, reinforced screen sections for vibrators. This standard type of edge is available in five different styles for electrical and mechanical vibrating machines.

Let our wire screen specialist show you how you can adapt these screen section assemblies to increase your profits.

There is a CLEVELAND Wire Screen for every purpose.

- NO PULL-OUT
- NO SAG
- LONGER SCREEN LIFE
- EXTRA STRENGTH
- EASY TO CHANGE
- DRUM-TIGHT TENSION

For detailed information on Cleveland Screen Section Assemblies write today for BULLETIN No. 6.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 E. 78 STREET CLEVELAND 5, OHIO

A P. & H. shovel used in a gravel pit to haul material to a crusher and also for loading trucks from a stockpile was destroyed by fire.

The insurance company refused to pay the loss because the shovel was more than 100 feet from a building. However, the higher court ordered the insurance company to pay the loss, saying that the policy covered an area within 100 feet from the stockpile conveyor, which was connected with the main building by chutes and electric wires, and *not* merely 100 feet from the main building proper. The court said:

"The P. & H. shovel was used in the gravel pit to haul material to the crusher and also for loading trucks from the stockpile. The crusher was an essential part of the plant and obviously could not operate without the delivery of the necessary raw materials."

Simple Evidence

Very frequently the higher courts rely on simple evidence when deciding a damage suit.

For illustration, in *Decuire v. Bozeman,* 32 So. (2d) 465, it was shown that a boy was riding a bicycle when injured in a collision with a motor truck owned by the Bozeman Concrete Company. The higher court refused to hold the concrete company liable in damages, saying that only the front wheel of the bicycle was bent, which was strongly corroborative of the testimony of the truck driver that it was the bicycle that ran into truck, and not the truck that hit the bicycle.

Reasonable Compensation

Although an employee had a previous injury, the higher court may allow compensation based on total disability for a new injury.

For example, in *M. B. K. Drilling Company v. Malaski,* 170 Pac. (2d) 245, it was shown that an employee was standing on the floor of a rig when he had a serious back injury. The employee sued to recover compensation based on total disability.

Although the company's counsel proved that the employee had previously injured his back, the lower court awarded total disability compensation. The higher court approved the verdict.

Cable Causes Accident

According to a recent higher court an employer who uses a dangerous instrument in a negligent manner is responsible for all injuries caused employees who did not realize the danger.

For example, in *Been v. Lummus Company,* 173 Pac. (2d) 34, it was shown that two employees were in a sand and gravel truck when the driver failed to see a small cable stretched across the road. Suddenly the truck cab, in which the employees were riding, was jerked off the chassis, causing serious injuries to the employees, who sued the employer for damages. The higher court allowed damages because it decided that the truck driver was not negligent in failing to see the small cable. This court said:

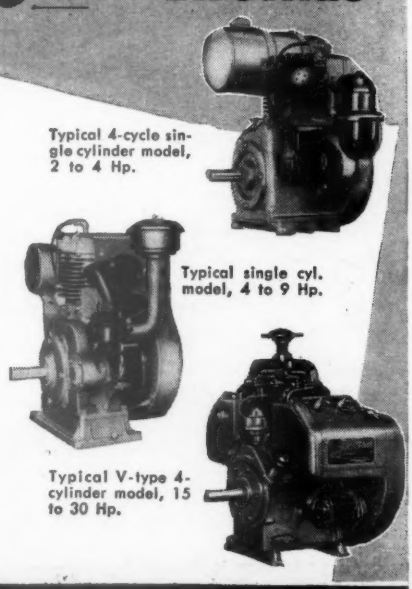
"A small cable across a roadway slightly above the range of the vision of

Increase The PRODUCTIVE CAPACITY of Your Mechanized Equipment with WISCONSIN *Air-Cooled* ENGINES

If you build or use any kind of equipment that *is* or that CAN be successfully engine-powered — there is a fairly definite certainty that you can actually increase the productive capacity of the machine by motorizing with a Wisconsin Air-Cooled Engine.

This rather broad statement is predicated on the fact that Wisconsin Engines are notable for continuous, high ratio power output as well as an absolute minimum of maintenance and servicing layups. In addition to the basic advantages of air-cooling, light weight, compact design and all-weather serviceability—you are assured of "Most H.P. Hours" of on-the-job operation, thanks to advanced engineering and heavy-duty design and construction.

Wisconsin Engines are worth looking into on all counts. Your interest will be heartily reciprocated.



Typical 4-cycle single cylinder model, 2 to 4 Hp.

Typical single cyl. model, 4 to 9 Hp.

Typical V-type 4-cylinder model, 15 to 30 Hp.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

"Cape Ann"
FORGED
STEEL DROP BALL

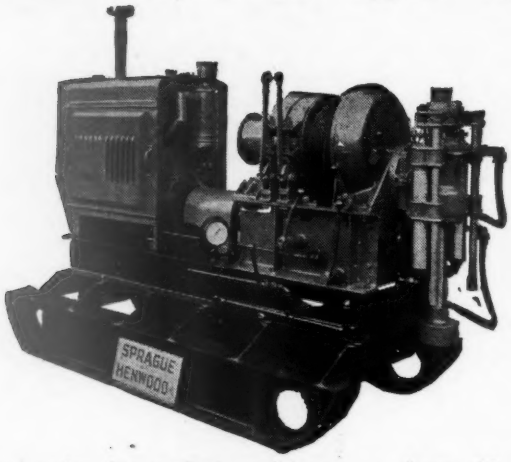
NOW — a new design. Cable replacements minimized. Forged connecting link, protected by deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Furnished complete as shown.

Deliveries prompt.

For further information write—

Cape Ann Anchor & Forge Co.
Gloucester - Massachusetts

Sprague & Henwood
CORE DRILLING MACHINES
For EXTRA Efficiency



"Used under the toughest conditions . . . always able to handle any core drilling job easily"—that's how operators all over the country describe S&H Machines.

These high-speed, sturdy units back up the drill bit with ample, sustained, economical power.

Available in two types of feed, as desired. "Screwfeed" and "Hydraulic." Hydraulic swivel head can be furnished for either water or oil operation. Write for Details.

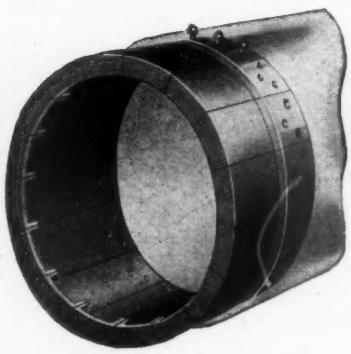
ALSO DRILLING CONTRACTORS

SPRAGUE & HENWOOD, INC.
Dept. K Scranton, Pa.

Drill Down Fast
with
S & H
Bortz
DIAMOND
BITS

OVER 1000 Installations in cement plants!

In the past 20 years over 1000 PYRASTEEL Kiln Ends have been installed. Some have lasted for 14 years without a failure—6 to 8 years' service is quite common.



PYRASTEEL
SEGMENTAL
KILN ENDS

About 165 million barrels of cement—over 76% of the annual output — is produced in plants using either or both of our alloys, PYRASTEEL and EVANSTEEL.

PYRASTEEL is equally effective and economical in other high-heat applications, such as conveyor screws, feed pipes, clinker coolers, drag chains, and cement cooling equipment.

You can't beat this performance of PYRASTEEL Kiln Ends for avoiding burnouts and shutdowns, and insuring continuous production with low cost maintenance.

Unit Segments are easy to install or replace.

Write for PYRASTEEL Bulletin.

CHICAGO STEEL FOUNDRY COMPANY
PYRASTEEL for high temperatures
KEDZIE AVE & 37TH ST.
CHICAGO 32, ILL.
Makers of Alloy Steel for 35 Years
EVANSTEEL for strength

a truck driver is not necessarily an obvious peril."

However, this court said that if the driver had in day time run into a ditch which crossed the highway the employer would *not* have been liable because the driver was negligent in failing to see the ditch.

Not Minerals

A new higher court decision upheld the old law that the term "minerals" when used in a deed, contract of sale, or other instrument, does *not* include sand and gravel.

For illustration, in *Psencik v. Wessels,* 205 S. W. (2d) 658, a property owner conveyed by deed certain lands. In the deed was a clause reserving all "minerals". The court was asked to decide whether this clause gave the property owner the right to remove sand and gravel from the land. The higher court held in negative, saying:

"The term 'minerals' does not include ordinary commercial gravel."

Also, see *Waring v. Foden,* 1 Ch. 276, 86 A.L.R. 969, in which the higher court held that a reservation in a deed of "all mines, minerals and mineral substances within or under" the property, did *not* include commercial sand and gravel, which was prevalent in the property and in the vicinity.

Must Prove Case

An injured employee who applies for compensation under the State Workmen's Compensation Act must *prove* that the injury was sustained doing his work or employment, if the Industrial Commission so demands, or he cannot recover any compensation.

For illustration, in *Thackston v. Lansdell Company,* 49 Atl. (2d) 140, it was shown that one Thackston was hired to spread a heavy tar on driveways. The tar was applied at high temperature and gave off a considerable quantity of smoke and fumes. At the end of the working day, Thackston's eyes smarted and burned. *Five days later* he went to a doctor, who treated him for about ten days. Later Thackston went blind. He sued for compensation under the State Workmen's Compensation Act, but failed to prove that his blindness was caused by smoke and fumes from the tar.

The higher court refused to award compensation, and said:

"It does not appear to us that the hypothesis that the uveitis and consequent loss of vision of the petitioner's (Thackston's) right eye was caused by the incident."

Contractor Breached Sale Contract

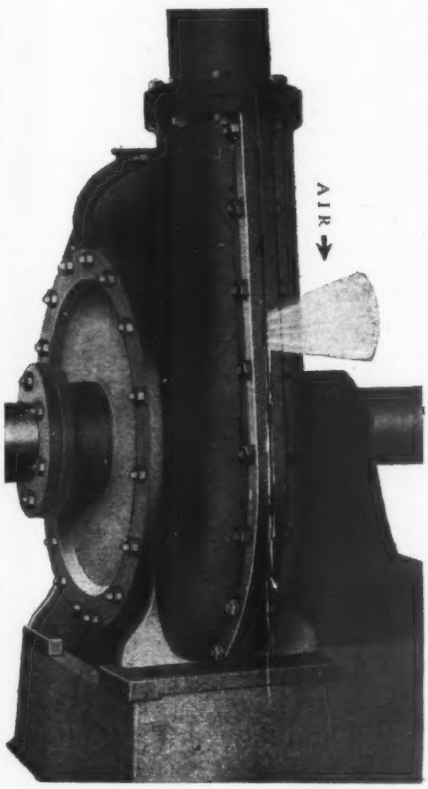
According to a recent higher court, if a party to a contract breaches any clause, the other party can disregard all provisions in the original contract. Hence, if a contractor rents equipment under a contract to return it, he must pay for it if he fails to return it.

For example, in *Handler v. Thompson,* 182 Pac. (2d) 756, the testimony showed facts, as follows: The Thompson Company rented to a contractor certain equipment. The contract stated that the contractor would deliver back all such

WE WILL LET YOU WRITE YOUR OWN GUARANTEE

THAT YOU'LL NEVER WEAR OUT a "Tell-Tale" Centrifugal Sand and Gravel Pump Shell!

(Patented)



HERE'S HOW AND WHY—

A length of flax packing is clamped between the halves of the split "Tell-Tale" Pump Shell to form an air-tight joint between the Shell and its Renewable Inner Lining.

When the abrasive action of the sand and gravel, or other materials being pumped, finally cuts thru the tough Shell Liner, (and a few minutes later thru the flax packing) air will be sucked into the nearest port hole in the Shell. (What appears in the picture above to be a spray of water spurting out of the Shell is the artist's conception of air being sucked into it.) This causes the pump to lose its prime and immediately stop pumping materials. It also serves as a warning to the operator that the Shell Liner has worn out.

ASK FOR COMPLETE DETAILS; STATE SIZE PUMP INTERESTED IN AND REQUEST BULLETIN "P" ON AMERICA'S HIGHEST PRODUCTION PUMP.

PEKOR IRON WORKS

DRAWER 909

Columbus Georgia

equipment to the company's yards.

The higher court held that the contractor must pay the company the value of the equipment not delivered back on the promised date.

Compensation v Damages

Modern higher courts consistently hold that employees can receive *compensation* under the State Workmen's Compensation Act for *all* injuries sustained within the scope of the employment. However, employers are liable in *damages* for injuries to employees *only* when the injury was caused by negligence of the employer. Therefore, if an employee in any manner *contributed* to the injury he cannot recover damages.

For example, in *Schrader v. Kessler Marble Company,* 178 S. W. (2d) 355, an employee sued to recover $20,000 damages for injuries sustained when he fell from a scaffold erected by the company for which he worked. However, the evidence proved that the injured employee had directed certain company employees how to erect the scaffold. Therefore, the higher court refused to allow damages to the injured employee, and said:

"Plaintiff (employee) an agent of Marble Company, participated in, and supervised the work of installation. . . . Negligence of agents and servants of the Marble Company should be imputed to plaintiff."

Liable For $20,000 Damages

According to a recent higher court, if negligence of an employer results in death of an employee his dependents may recover heavy damages based upon "life expectancy."

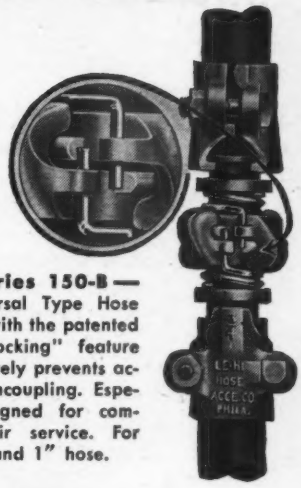
For illustration, in *Missouri Company v. Gilbert,* 178 S. E. (2d) 73, an employee who was employed to load gravel on cars in a pit fell under the wheel of the car, severely cutting, bruising and lacerating him to the extent that he died from the injuries so received. The testimony showed that negligence of the employer caused the employee's injuries and death. In holding the employer liable for $20,000 damages, the higher court said:

"The deceased at the time of his death was 30 years of age, and had an expectancy of life of 35 years. . . . In estimating damage resulting from loss or impairment of earning capacity, 'the reasonable and dependable probabilities, looking through all that may happen and for all the years for which the computation is to be made are the elements which are to guide to a fair and acceptable result.'"

See *Capital Company v. Industrial Commission,* 146 Pac. (2d) 902. In this case it was shown that the owner of a power shovel rented it to load sand and gravel into trucks for a construction company. The owner of the shovel employed an employee to operate it. This employee was injured and sued to recover compensation from the construction company.

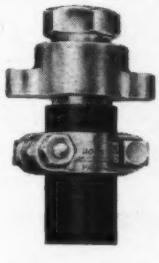
The higher court refused to allow compensation to the employee and said that the owner of the shovel was the legal employer and, therefore liable.

LE-HI



LE-HI Series 150-B — The Universal Type Hose Coupling with the patented "Safety-Locking" feature that positively prevents accidental uncoupling. Especially designed for compressed air service. For ½", ¾" and 1" hose.

HOSE COUPLINGS



LE-HI Series 200-G or W — "Light Type" Air Hammer Hose Couplings. For *lighter* rock drills, jack hammers, sinkers, tampers, etc. Fast, easy coupling and uncoupling. Fully interchangeable. For ½" and ¾" hose. Available in ground joint and washer types.

ARE TOUGH

LE-HI Series 350-G or W — Heavy Duty Air Hammer Hose Couplings. Designed for the toughest kind of jobs. For *heavy* jack hammers, rock drills, and sinkers; also drifters, stopers, wagon drills, etc. Maximum air flow. Leak-proof seal. For ¾" and 1" hose. Ground joint and washer types available.

LE-HI MAKES A GOOD CONNECTION!

Go to your local distributor for these rugged, economical LE-HI Hose Couplings — NEVER SOLD DIRECT.

LE-HI HIGH and LOW PRESSURE HOSE COUPLINGS

HOSE ACCESSORIES CO.

2760 North 17th Street

Philadelphia 32, Pennsylvania

Branches at Chicago, Houston and Los Angeles

IT COSTS NO MORE

TO USE THE BEST

REPLACE WITH

"Indian Brand"

Shovel Dippers
Dipper Teeth
Shovel Treads

Crusher Jaw Plates
Mantles—Concaves
Bowl Liners
Roll Shells

Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA

ESTABLISHED 1881

WHY GAMBLE WITH RESULTS?

Take the hit-or-miss out of Screening with a UNIVERSAL! Every part of this machine has been designed to give the operator less expense and more productive efficiency.

Type "MR" 42" x 96" Double-deck

Write today for catalog No. 107, and discover why hundreds of operators have profited by screening the UNIVERSAL way!

UNIVERSAL VIBRATING SCREEN CO.
RACINE - - WISCONSIN

traffic news

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 84844 (2)—Sand (except blast, core, engine, filter, fire, or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and gravel, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Portsmouth, O., to Dunham, Ky., 176 cents; Herman Siding, Ky., 165 cents net ton, subject to Exparte 162 and 166 increases.

Docket 84999 (1)—Quartzite: stone, viz.: fluxing, furnace or foundry, melting or refractory (unburned); limestone, crude, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car furnished, except when car is loaded to full cubical or visible capacity, actual weight will apply—establish on, from Ashtabula Harbor, Ohio, to Ceico, Ohio, 45 cents gross ton, not subject to ExParte 162 and 166.

Docket 85022 (2)—Establish on lime, common, hydrated, quick or slaked, in bags, barrels, casks, iron drums or in bulk, carload from Mosher and St. Genevieve, Mo., following rates, subject to ExParte 162 and 166 increases:

	Proposed Rates	
	Minimum Weight	Minimum Weight
To	30,000 lb.	50,000 lb.
Carver, David and Prestonburg, Ky.	23	19
Dunham, Elkhorn City, Jenkins, Shelby, Wayland, Weeksburg, and Wheelwright, Ky.	24	19

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

Docket 70793 (1-R)—To establish rate on crushed stone, carload minimum weight 60 tons of 2000 pounds, except that when cars of lower capacity are furnished for carrier's convenience, the carload minimum weight will be the marked capacity of the car, from Lynn, Mass., to Gloucester, Mass. Present, 92 cents net ton. Proposed, 67 cents net ton. Rates include ExParte 162A increase but are subject to ExParte 166 increase.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 44433 (2)—Amend item 2150 Western Trunk Line Tariff 120-I on dolomite, roasted, Dolly Siding, Mo., Chicago and Granite City, Ill., to Geneva, Utah, by changing the minimum weight to 90 percent of marked capacity of car.

TRUNK LINE ASSOCIATION DOCKET

Docket 44703—Limestone, broken, crushed, ground or pulverized, carload minimum weight 60,000 pounds from Wingdale, N. Y., to the following points:

	Per Net Ton
Bridgeville, Butler and East Butler, Pa.	$3.47
Canton, Pa.	2.70
Clarksville, Pa.	3.58
Erie, Pa.	3.25
Hamilton, Pa.	3.14
Oakland, Pa.	3.36

Above rates subject to ExParte 162-A and X-166, amendments thereto or reissues thereof. Reason: On same basis as rates applying to other point.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket D-11-139—It is proposed to establish on cement, masonry or natural lime, mason's from Mankato, Minnesota to Chicago, Illinois, and points taking same rates 23 cents per one hundred pounds not subject to tariff X-162-A but subject to tariff X-166.

Docket X-D-25-203—Lime, carload minimum weight 50,000 pounds per car. Origin—Sault Ste. Marie, Michigan. Destination—Ceico, Ohio. Proposed $3.80 per net ton plus ExParte 162-A and 166.

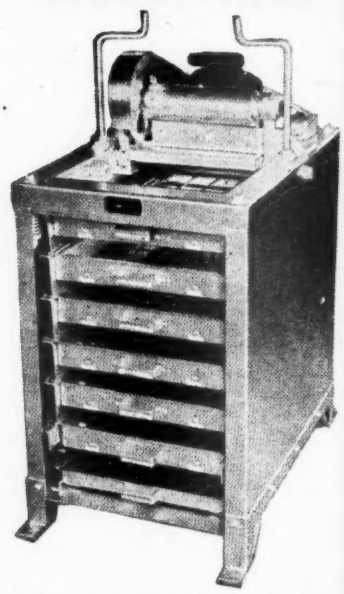
Docket X-E-41-937—Crushed stone and rip rap, carload from Ft. Scott, Kansas, to the following points:

	Cr. Stone Carload Proposed Rates*	Rip Rap Carload Proposed Rates*
Red Cloud, Neb.	207	250
Cambridge, Neb.	267	280
Naponee, Neb.	222	260
Redwillow, Neb.	277	280
Republican, Neb.	227	270
Alma, Neb.	237	270
McCook, Neb.	282	290
Culbertson, Neb.	287	290
Benkelman and Enders, Neb.	297	300
Wray, Colo.	320	320

*Proposed rates to expire one year from effective date, unless sooner canceled, changed or extended.

GILSON
Mechanical Testing Screen

FOR TESTING AND RESEARCH



Handles up to one cubic foot of sample. Practical for close sizing of two to three tons per day for recombination in research program. Also for routine testing. Size range 4 inch to 200 mesh. Let us send a descriptive bulletin.

GILSON SCREEN CO.
BOX 186 MERCER, PA.

NEWS OF CONCRETE MANUFACTURERS

Los Angeles Firm Awarded County Bartile Franchise—72 Machines on Order

Stokes & Collins of Los Angeles have been granted an exclusive franchise to manufacture and apply Bartile concrete roofing tile in Los Angeles County, according to an announcement by C. E. Barber of the E. P. Barber Co., Bloomington, Calif.

The new franchise has contracted the purchase of 72 Bartile machines, which will be installed and operated in a number of strategically-located plants in the Los Angeles area. The first plant has been set up at El Monte, where a battery of four Bartile machines is in operation.

Ohio Safety Advisor Offers Simple Dust Problem Remedy

In an article appearing in the *Monitor,* publication of the Ohio Industrial Commission, Lester M. Merritt, safety advisor, discussed the dust problem in connection with emptying paper bags of cement, silica flour, finely ground flint, feldspar, china clay and similar materials.

Mr. Merritt offers a simple solution for this familiar problem, one which will effectively reduce the health hazard of the operation. "All that is necessary..." he states, "is to puncture the end of the bag away from the opening through which the material must flow. When air can pass into the bag at the point where a vacuum would have been formed, then the material can flow out smoothly and easily, thereby decidedly reducing the amount of dust produced."

Tellyer Pipe Plant Resumes Production after Fire Damage

Production was recently resumed at the Tellyer Concrete Pipe Company's plant in Albuquerque, N. M., according to an announcement made by Henry Tellyer, owner.

The plant was damaged to the extent of $40,000 in a fire which destroyed the main building and a large stock of parts. The rebuilt portion is now of fireproof construction.

Block Manufacturer Wins Decision in Nuisance Case

The State Superior Court of Pennsylvania has affirmed the right of Dominic Pasquini, proprietor of Wyoming Valley Cement Products Co. at Wilkes-Barre to install machinery for making vibrated blocks at the firm's Seneca Street plant. Previously concrete blocks were made by stamping. Seven nearby property owners sought to have the company restrained on the grounds that the new machinery would constitute a nuisance.

President Judge W. Alfred Valentine originally granted permission for the installation provided it were located at least 37 feet and 2 inches from the nearest adjoining property. When the machine arrived, it was 6 feet wider than anticipated, requiring a modification of the judicial order. The complaining property owners again appealed to the courts, with the Superior Court affirmation of Judge Valentine's decision resulting.

Master Builders Co. Offers Bulletins on Concrete Design

In an attempt to supply an adequate answer for the query: "What is the best way to specify and design concrete for a job?" The Master Builders Company, Cleveland, O., offer reprints of bulletins published in two national associations. *ACI Standard Recommended Practice for the Design of Concrete Mixes* and *Tentative Specifications for Ready-Mixed Concrete,* publications of the American Concrete Institute and the American Society for Testing Materials, respectively, are sent in a kit with a card attached for ordering additional copies. The ACI bulletin is offered in both English and Spanish.

On the cover of the kit are suggested specifications for concrete and information of Pozzolith .

Increased efficiency will be offered customers of Ray Sablain, Inc., Lansing, Mich., with the addition of seven new ready-mix trucks. These units boost to 74 the company's fleet of trucks. Mr. Sablain operates two large ready-mix concrete plants in Lansing.

The Cheboygan Cement Products Company, Cheboygan, Mich., operated by Maurice E. Dore, will have an expanded capacity through the addition of new equipment made by the Besser Manufacturing Company, Alpena, Mich.

Coming Events

July 16-24, 1948—Chicago. Convention and Road Show, American Road Builders Association, Soldiers Field.

July 21-25, 1948—Detroit. Annual meeting, American Society for Testing Materials.

September 20, 1948 — Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor. Soldier Field.

New Refractory Concretes Of New York Concern Combine Desirable Features

A high-strength, chrome-base refractory concrete, known as "Kromecast," has been developed by the Babcock & Wilcox Co. of New York, N. Y. This product makes available an easily installed concrete combining the refractory and slag-resisting properties of chrome-base materials with the ability to support loads at high temperatures.

Kromecast can be installed in the same manner as ordinary concrete or can be applied by plastering or with a cement gun. According to the manufacturer, the product possesses a very high volume of stability at temperatures up to 3100 deg. F.

Because of its strength at high temperatures, Kromecast can be used for construction of vertical walls and roof arches in many types of furnaces. Other applications are to hearths and floors in metal heating and forging furnaces, car tops, electric furnace roofs, furnace doors and framing linings, and patching furnaces which have been damaged.

For use in furnaces where temperature and spalling conditions are not as severe, this company has produced a second new product, "Hydrochrome." This chrome-base concrete has a temperature use limit of 2800 deg. F., making it applicable to the majority of water-cooled boiler furnaces and metal-processing furnaces with moderate operating temperatures.

Ready-Mix Equipment Installed By Killins at Ann Arbor Plant

Installation of a new $8,000 concrete mixer at the Killins Gravel Company's facilities at Ann Arbor, Mich., completes the firm's ready-mixed concrete equipment. The mixer, made by the T. L. Smith Company of Milwaukee, is being installed on 19-foot columns set in a concrete footing. The company has already purchased six concrete dump-trucks of 4-cu. yd. capacity. Air-entrained cement will be used exclusively in the concrete.

Deliveries will be made within a radius of 30 miles without danger of segregation. The new plant was scheduled to go into production early this month. Later this year boilers will be installed in order to facilitate continuation of operations during cold weather.

Stanley S. Brooks and Frank C. Amato have purchased the De Angelis Concrete Block Co., 1457 Tyler Ave., El Monte, Calif. Operations are being continued under the new name of the Atlas Concrete Block Co.

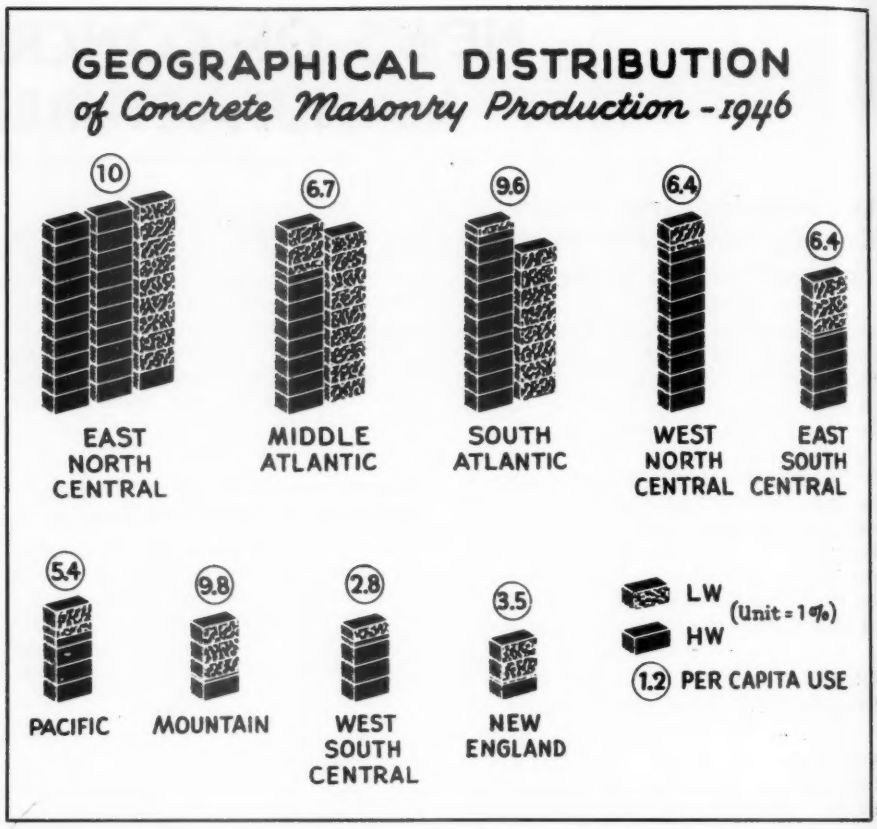
Details of Masonry Practice and Construction Discussed in New Book

Published in two volumes, *Masonry Simplified* explains the what, the why, and the how, of both masonry construction and masonry practice. For many years the authors, J. Ralph Dalzell and Gilbert Townsend, have been in daily contact with contractors, architects, engineers and manufacturers of building materials. From the vast store of information gained through close association with the building trades, there developed a real understanding of the problems encountered in masonry work and the best methods for solving them. It is this knowledge that the authors have made available in *Masonry Simplified.*

Volume I on tools, materials and practice, discusses all aspects of elementary masonry work. Of particular interest to the concrete products industry is the big chapter devoted to concrete blocks. Following a short introduction to concrete masonry, a description is given of those concrete units most frequently used.

The companion book, Volume II, deals with the details of practical masonry construction. The principles laid down in Volume I are applied to construction problems which frequently confront the mason on the job. Several chapters are devoted to the techniques underlying the design of concrete masonry structures, e.g., chimneys, walls, silos, septic tank systems, and many others.

An outstanding feature of both books is the large number of illustrations which supplement the word descriptions in the text. For the most part, they are of the pictorial or three-dimensional type, since drawings of this nature are the easiest to visualize.

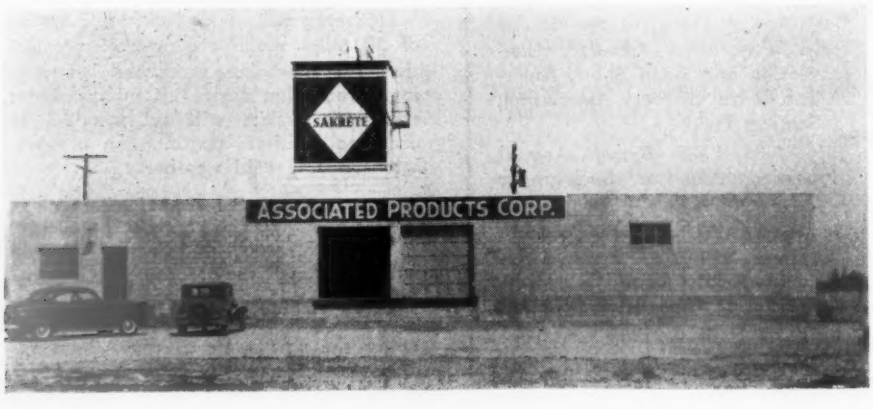


Associated Products Corp. Makes Sakrete at New Plant

Sakrete, dry-mixed concrete in bags, which was developed by Arthur Avril of Cincinnati and is being marketed nationally from strategically-located plants, is now available in the Los Angeles area from the new plant pictured here.

The Sakrete licensee for southern California is the Associated Products Corp., which recently completed its new combined plant and warehouse at Bassett, Calif. The building, of concrete-masonry construction, is 100 by 400 feet in size, and houses the batching and weighing equipment, which began turning out the product for the first time early in March, 1948. The rotary dryer is located outside and at the rear of the building. Sand and gravel are trucked to the plant from aggregate plants in the immediate vicinity in the San Gabriel Valley. Bagged cement is being used initially but bulk facilities are to be installed later.

The four Sakrete products — all-purpose concrete, sand-cement, mortar mix and a waterproofing grout—are packed in sewed-mouth, multiwall paper bags and marketed through hardware stores, nurseries and building-supply firms throughout southern California.



Brickcrete Plant Opened At Dallas by New Concern

At Dallas, Tex., a newly organized firm, the Brickcrete Building Products Company, Inc., has begun producing pressed concrete masonry units at its new plant. Two sizes of block are made—8 by 12 by 3½ inches and 4 by 12 by 3½ inches.

The company distributes franchises in Texas for other similar plants operating, as does the Dallas plant, under agreements with the Dunn Manufacturing Company, Holland, Mich., builders of the machinery and owners of the trade name.

D. A. Blankenship is president of the Dallas concern. Other officers are W. L. Fouts, vice-president; M. E. Winburn Jr., secretary; F. Gobert, treasurer; E. M. Garner, plant manager and engineer.

• At the plant of the Virginia Dunbrik Co., Inc., Lynchburg, Va., a Victor "Feedmatic" masonry saw (Victor Engineering Corp.) is profitably employed to reclaim salvage and to score the ends of block for insertion of steel sash.

Build Ready Mix Plant for Power Company Project

Fifteen thousand cubic yards of concrete would make a solid block a foot wide, a foot high, and seventy-six miles long. In order to supply this much ready-mixed concrete, required for the construction of a huge condenser well, the Richter Concrete Corp. of Cincinnati, O., installed a central-mixing plant on the job site.

This mixing plant is equipped with a 600-barrel bulk cement storage bin, screw feeder and bucket elevators for handling the bulk cement, and ample storage facilities for the aggregates. The cement is delivered to the plant in specially constructed bulk cement trailers pulled by Mack tractors. The aggregates are brought in on standard dump bodies.

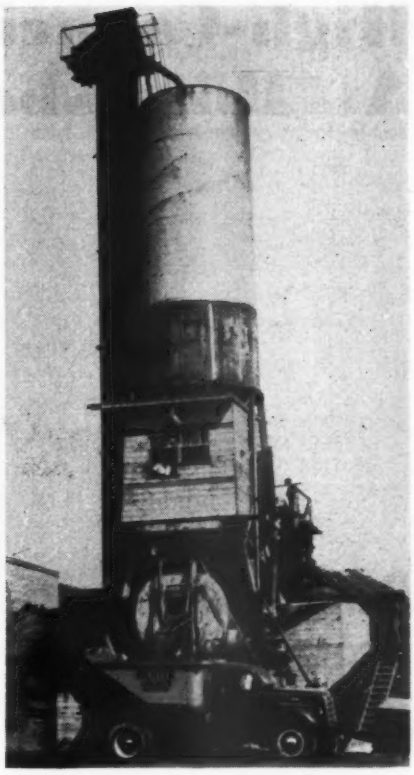
Cement and aggregates are batched by weight and water by volume. With the three cubic yard stationary mixer, equipped with the necessary charging hopper and discharge chute, the plant is capable of supplying 60 cubic yards of concrete per hour. The mixed concrete is hauled from the batcher to the job in 3-cu. yd. Dumpcretes.

The condenser well, which, in reality, is a dry pit, will house various pieces of equipment needed to generate electricity. The new well is part of the general expansion program being carried on by the Cincinnati Gas and Electric Company at their Columbia Power station. This station is located 20 miles West of Cincinnati on the banks of the Ohio River.

One of the more unusual aspects of this job, besides the erection of a complete ready-mixed plant, is the caisson method employed in sinking the condenser well. Although caisson work is not uncommon practice in bridge or dam jobs its application on this project represents a rather neat engineering feat.

The well is cylindrical in shape with an inside diameter of 70 ft. The walls are 6 ft. thick and 63 ft. high and required 3580 cubic yards of concrete. They were developed by pouring one complete 10-ft. section at a time. The first pour holds a cutting edge which knifes its way into the ground under the weight of each succeeding pour. As the well sinks into the ground, the earth is excavated from inside the cylinder. The steel forms are stripped and moved up after each 10-ft. section is completed. All walls are strengthened with reinforcing steel.

Once the well has sunk to grade a concrete seal is poured forming the floor or base of the well. This seal is a monolithic spherical segment 14 ft. thick at the center. It required 1581 cu. yds. of concrete to fill and had to be poured under water because at this depth the seal of the well is below the river level.

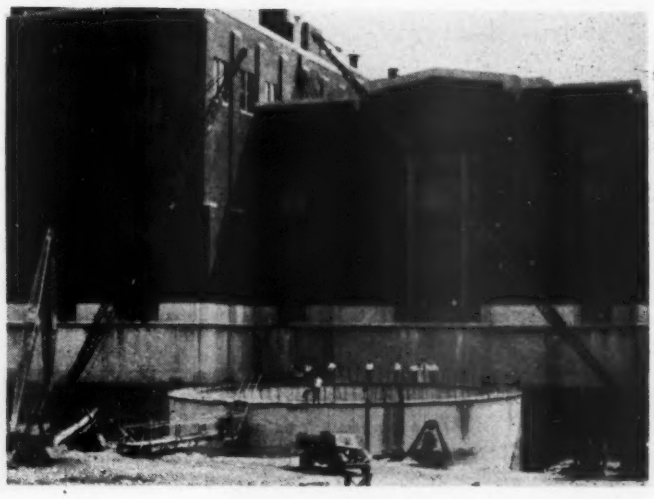


• The Richter Company's central-mixing plant which was installed at the job site.

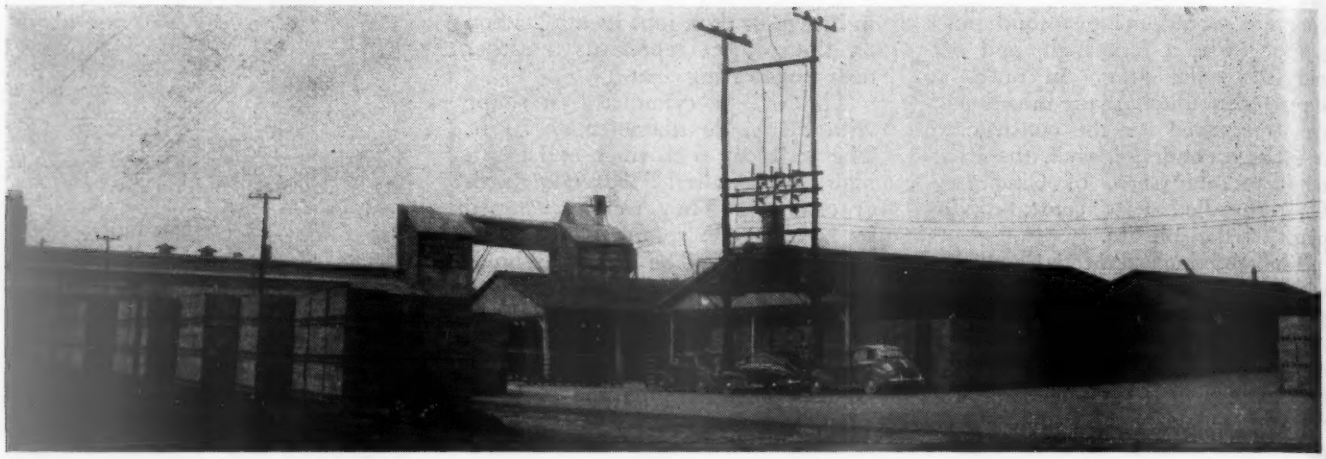
When the new turbo-generator unit is installed, the output of the Columbia Power station will be increased by 80,000 kilowatts. Its completion will represent one big step forward in the Cincinnati Gas and Electric Company's program to supply their customers with more and more electricity.

About 38,000 cu. yd. of concrete is being supplied by the ready-mixed-concrete fleet of Pacific Coast Aggregates, Inc., San Francisco, for new pier facilities in San Francisco Bay. The concrete is being used in pile jackets and the job is being done under contract by the Clinton Construction Co. under the supervision of the California Harbor Commission.

• Right, above: One of the 3-cu. yd. trucks discharging a load of concrete into the tremie.
• Right: Scene of the Richter Concrete Corporation's current operation at the Columbia power station of the Cincinnati Gas and Electric Company.
• Below: A load of cement on its way to the plant via special semi-trailer.



High-Capacity Machines Make History At Harrisburg Building Units Plant



• A general view of the completely revamped plant of the Harrisburg Building Units Co. at Harrisburg, Pa. Features of the layout include approximately two acres of paved storage yard, 18,000 square feet of which is under roof.

another ON THE SPOT report

THE big news in the concrete products field today is that the recently announced Stearns "15" automatic plain pallet block machine, after passing exhaustive tests, is now in full commercial operation at a number of plants in the East and Middle West. The "15", a radical departure from previous Stearns designs, derives the numerical designation from its rated productive capacity of 15 8-in. equivalents per minute. Under optimum conditions, tests have indicated that the new machine can produce up to 18 equivalents per minute, but even the more conservative 15-unit figure is believed to constitute a new record for the industry.

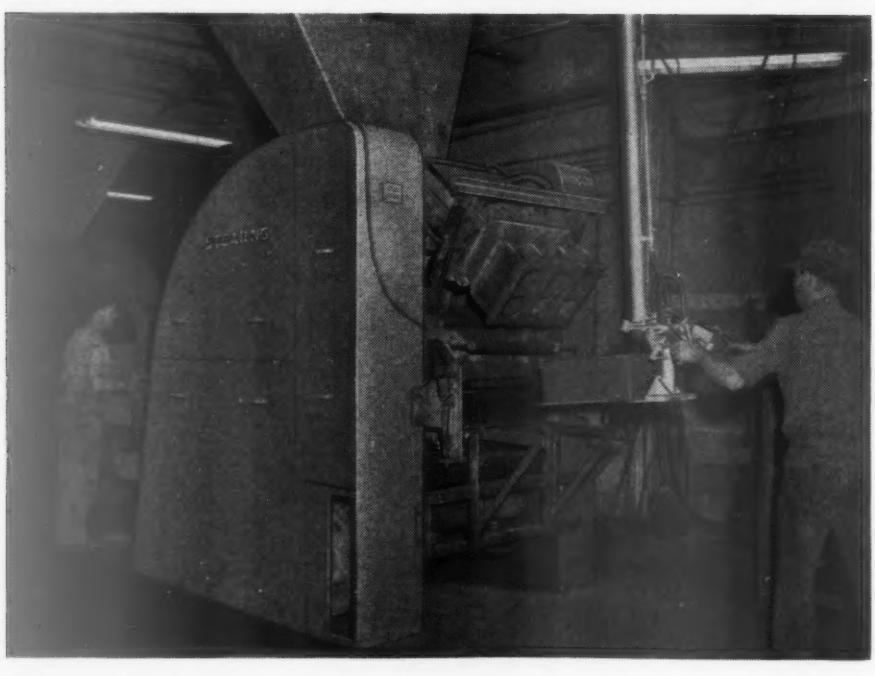
By WILLIAM M. AVERY

Two of these machines were installed in November, 1946, at the plant of Harrisburg Building Units Company in Harrisburg, Pa., as a part of a general revamping, modernization and expansion program. Promptly following public announcement of the "15" we received permission from Thomas F. Bausman, owner of the company, to visit Harrisburg and set the machines in operation, and a special trip was immediately arranged in order to give our readers a dependable "on the spot" report of this important development.

Process The "15" utilizes vibration applied both under the mold and on top of the block to turn out quality units of uniform texture and with fully pressed tops. The machine is covered under Gelbman patents and others involving the unique vibrator pressure head and the rotary agitator feed drawer. The operation is fully automatic once the machine is started, production being continuous without manual or control manipulation up until the time the molded units are delivered to the front of the machine.

The plain pallets are usually 5/16-in. steel plates measuring 18½ by 26 in., on which can be molded any multiple of precast units measuring 12 in. high by 25 in. wide by 18 in. long. A fully automatic pallet loader has been perfected since the Harrisburg installation was made, and is now available for all machines currently in use, as well as those produced in the future. This device makes the "15" a truly one-man operation, since it dispenses with the need of an extra or part-time man to load empty pallets into the rear of the machine.

Loader Pallet In operation, two pallets, each containing three 8-in. units (or equivalents) are allowed to accumulate on the pallet conveyor at the front of the machine. One man operating the pneumatic offbearer removes the two pallets simultaneously and loads



• The two new plain-pallet machines at Harrisburg are producing over 12,000 8-in. equivalents per 8-hour day.

them onto the curing rack, then removes two empty pallets from the next section of the rack and places them on the pallet loader at the front of the machine. The empty pallets are automatically cleaned, oiled and conveyed to the pallet magazine at the rear of the machine without additional manual handling. Automatic pallet loading, apart from its obvious advantages in respect to labor efficiency, will considerably cut the amount of rehandling of racks by lift trucks, since empty racks may be spotted immediately in loading position at the front of the block machine without an intermediate stop to unload pallets.

As mentioned before, this system of pallet loading had not been worked out when the Harrisburg installation was made. There the two block machines were placed back to back, with pallet magazines side by side so that one man may load pallets for both machines (see cut). The steel plates are conveyed automatically from the magazine to the machine, receiving en route an application of oil sprayed from perforated pipes. Surplus oil is removed from the pallets by pieces of rubber belting, the excess falling into open tanks beneath the loaders; from there it is recirculated by small pumps driven off the block machines. Solvac No. 1535 cutting oil, mixed with one part of oil to 15 parts of water, is used on the pallets.

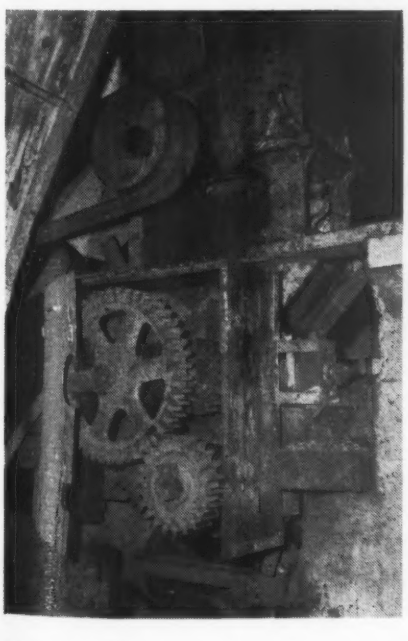
Production The new block machines at Harrisburg replaced two No. 9 Joltcretes which had been in operation since 1938. With no increase in manpower, the plant is now producing over 12,000 units per 8-hr. day. Although the new machines have on occasion been operated at the high rate of 18 units per minute yet the average production has been somewhat less, pending the development of facilities to handle the greater capacity. But the increased production from any point of view is truly remarkable, especially in view of the fact that the replaced machines were themselves high-production units which made three blocks per cycle.

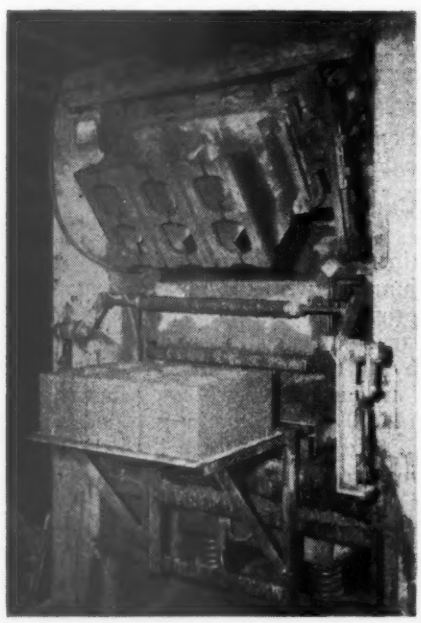
• Thomas F. Bausman, owner of the Harrisburg Building Units Co., has been in the block business since 1922.

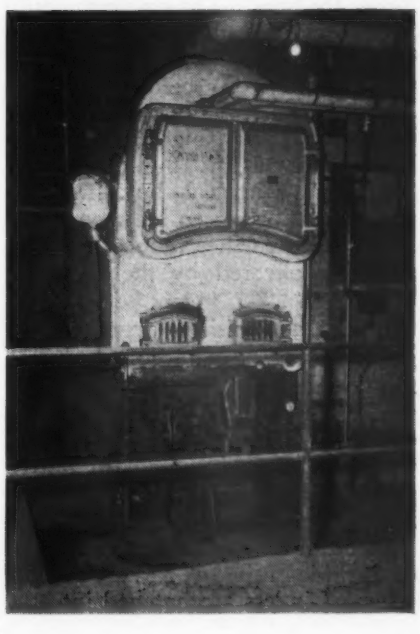
In commenting on the performance of the new machines, Richard R. Bowman, manager of the plant, mentioned particularly their excellent performance on mixes that would ordinarily be considered far too wet for machine molding. A small control lever located at the front of each machine enables the operator to compensate quickly and effortlessly for changes in mix consistency due to gradation of the aggregates or to the amount of water in the mix. Mr. Bowman also reports that present production was reached within a very few days after the new machines were placed in operation.

Labor Requirements The direct labor entailed in mixing, molding, offbearing, curing and stacking blocks is handled by an 8-man crew. One man operates the two 50-cu. ft. Stearns mixers which are located on the second floor of the plant building, above the block machines. Two of the crew are engaged in cubing the units, a process which will be described later in detail.

To some extent, of course, the remarkable improvement in labor efficiency must be attributed to the adoption of more efficient handling methods throughout the plant. Prior to the recently-completed expansion program offbearing had been done by hand, and all the lift trucks were hand-operated machines. The practice of cubing, probably more than any other single factor, has made it possible for the same number of men to handle 12,000 units per shift that were formerly required to handle not much more than half that number. Taken from any point of view, the company's achievement in halving direct labor cost per unit stands as a dramatic demonstration of what can be accomplished with modern equipment and methods.



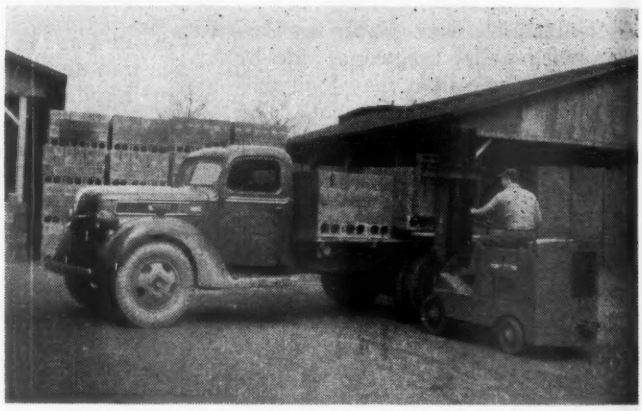




• Left: One of the roll crushers used in preparing cinder aggregate.
• Above: A closeup of the block machine, showing the unique vibrator pressure head which is one of the patented features. The head, supported by overhead trunnions, pivots forward just before the blocks are stripped.
• Right: The 95-hp. oil-fired boiler which supplies steam for curing.

• The Harrisburg machines are placed back to back and pallets are loaded manually. See text for full description.

• The two 50-cu. ft. mixers are located on the second floor of the plant building directly above the block machines.



• Above, left: Cubing units directly on the forks of one of the six power lift trucks.
• Above, right: Loading a 2-ton flatbed truck with one of the lift trucks. A six-ton load is set on in four minutes, against 35 minutes with hand loading.

Cinder Processing The company maintains a stockpile of about 150 carloads of soft-coal cinders as insurance against shutdowns, but under normal conditions the loaded cars are dumped into a track hopper from which the crushing and screening plant is fed. The main elevator discharges on a 3- by 8-ft. single-deck Link-Belt vibrating screen which removes the fines. The coarse material passes over a short belt conveyor (with a magnetic head pulley to remove tramp iron) before being discharged into a New Holland hammermill. Two New Holland roll crushers (a 10- by 16-in. and a 16- by 12-in.), with a 2- by 5-ft. single deck vibrating screen between them, are used to further reduce the 1-in. clinkers delivered by the hammermill.

Since the finished aggregate all goes into one bin, a 1-cu. yd. dumping hopper has been installed at the top of the storage tower to prevent the segregation which usually occurs when a bucket elevator is permitted to discharge such materials directly into a bin. This dumping device trips automatically, discharging first to one side of the bin and then to the other. Cinders are batched into the 50-cu. ft. Stearns mixers by volume. Cement from a 450-bbl. Butler bin is batched by weight.

Curing Facilities for steam curing were installed for the first time at the Harrisburg plant in conjunction with the general expansion program. Eleven kilns were constructed, each measuring 7 ft. wide by 7 ft. 6 in. high by 58 ft. 10 in. long, and having a total capacity of 14,000 8-in. equivalents.

After the kilns are loaded, steam, supplied by a 95-hp. Kewanee Type C oil-fired boiler, is introduced until the temperature reaches 180 deg. F., when the flow is cut off. Heat and steam are blown out with air before the kilns are unloaded the following morning.

Cubing and Handling Six towmotor lift trucks, one a standby unit, are used for handling loaded and empty racks, charging and discharging the kilns and for cubing and loading trucks for shipment. The cubes, 5 units deep, 3 wide and 4 high (or 60 equivalents per cube) are laid up directly on the forks of the trucks. By forming the cubes 5 units deep, each cube loads half the width of a 10-ft. flat-bed truck (see cut).

In preparation for large-scale operations the company paved a 2-acre storage area adjacent to the plant and erected six 40- by 75-ft. sheds for covered storage and for cubing operations. This provision makes it possible to maintain full-scale operations regardless of weather. During heavy winter weather snow is cleared from the runways between buildings with a Caterpillar diesel tractor.

Truck Fleet Nine flat-bed trucks, all 2-ton machines with 10-ft. beds, are used for making deliveries. Each machine hauls a 6-ton load, which can be set on in 4 minutes flat, as compared with 35 minutes formerly required for hand loading. Breakage in handling has been cut in half since the plant resumed operation, largely due to the practice of cubing. The company at present has approximately 500,000 units stored under roof, another straw in the wind indicating that the block business is definitely drifting back to a buyer's market.

Lightweight Ready-Mixed Concrete Reduces Dead Load 8000 Tons

another ON THE SPOT report

AN uncommonly interesting application of modern concrete technology was brought to our attention recently in connection with an extensive addition now under construction for a large department store in Cleveland, Ohio. In order to obtain as much background information as possible, we made a special trip to Cleveland and spent the better part of a day inspecting the project with William B. Miller, one of Cleveland's consulting engineers.

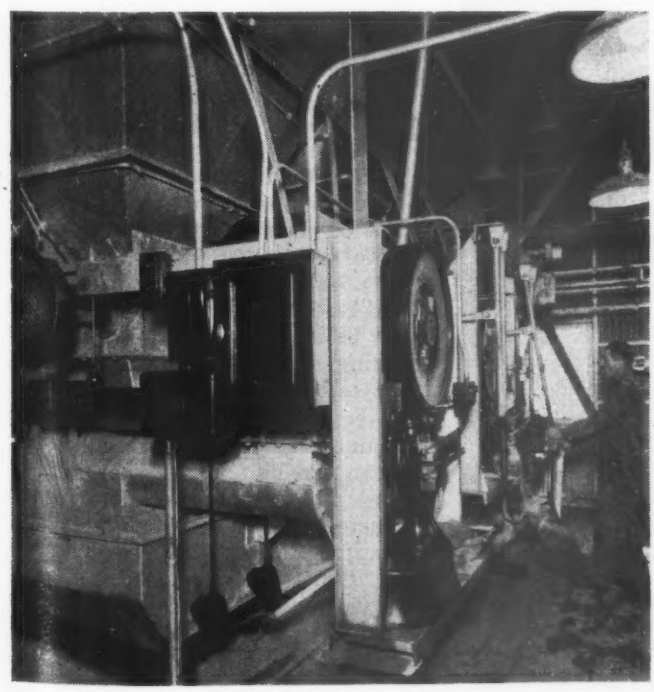
By WILLIAM M. AVERY

• A general view of Goff-Kirby's modern batching plant at Cleveland, O. The 6-compartment bin accommodates 300 tons of aggregates and 600 barrels of cement.

As Mr. Miller explained it, the design of the 14-story structure, an annex to Halle Brothers' main store in downtown Cleveland, was originally based on the use of sand and crushed stone concrete for all floors and for fireproofing of structural steel. This initial design contemplated only three mezzanine floors. Before ground was broken for the job, however, the owners decided they wanted seven additional mezzanines, or ten in all. Soil-bearing value tests quickly established that with the resultant increase in column loads it would be an absolute impossibility to keep the conventional mat type foundations inside the property lines.

With almost 14,000 cu. yds. of concrete called for in the entire job, the simplest method of reducing the total dead load was to use lightweight aggregate in place of sand and crushed stone. A recheck of the design, based on the use of Haydite concrete, established that a sufficient reduction would be effected in column loads to keep the foundations within the site. (Bearing piles were discussed but the idea was abandoned when consideration was given to possible damages to adjacent properties.)

Under Mr. Miller's direction extensive tests were carried out by Herron Testing Laboratories Co. of Cleveland to arrive at proportions which would consistently yield Haydite concrete of the required strength and plasticity and be practical as to field conditions. It was found that sufficient plasticity could be obtained with cements containing interground air-entraining agents, but in every case there was sufficient loss of compressive strength to disqualify the concrete. Conversely, a series of tests in which regular Portland cement was used with a cement-dispersing admixture (Pozzolith) resulted not only in excellent plasticity, but also in actual gain in the compressive strength of the concrete.



• The 4-cu. yd. batcher at the Goff-Kirby plant. The compensator scale [(SC)² and Toledo] in the foreground permits adjustment of water addition in accordance with the amount of moisture in the aggregates.

Specifications for the concrete were accordingly set up on the basis of using seven sacks of regular Portland cement to 1.1 cubic yard of Haydite aggregate, with the addition of .9 pound of Pozzolith per sack of cement, to obtain the desired plasticity, yielding 1 cubic yard of concrete in place. The Haydite concrete thus produced readily met the 3,000-lb. compressive strength requirement, and showed no tendency to segregate or otherwise resist proper placement.

The over-all contract for supplying concrete for the Halle Brothers job was let to Cleveland Builders Supply Co., who in turn sub-let the light-weight portion of the contract to the Goff-Kirby Company, who have the exclusive agency for Haydite concrete in the Cleveland area. Grade BX (combined) Haydite, passing ½-inch mesh down to dust, is supplied to the latter concern by the Hydraulic-Press Brick Co. of South Park, Ohio.

The building project is within approximately two miles round trip from Goff-Kirby's loading plant where all materials are stored and

all batching is done. The plant consists of a six-compartment Butler bin—4 compartments of 75 tons capacity each for aggregates and 2,300-bbl. compartments for cement. Aggregates are charged into the batching plant by a 24-in. wide by 228-ft. long inclined belt conveyor, which can be fed by bottom-dump railroad cars, dump trucks or from stockpiles by means of a yard crane. Most of the fine aggregate, and a considerable share of the coarse aggregate consumed in Goff-Kirby's operations are delivered by lake boats which unload at the company's own dock adjacent to the plant. Cement is loaded into the plant from hopper cars or trucks by means of a 50-t.p.h. bucket elevator.

The 4-cu. yd. weigh hopper for aggregates is operated manually, whereas cement and water are measured by automatic push button controls. In all its operations the company uses the $(SC)^2$ system for determining the amount of moisture in the aggregates and compensating the batches accordingly. Equipment for this purpose included a special platform-type laboratory scale for direct determination of moisture, and an $(SC)^2$ compensator batching scale (see cut) to which discs may be added or removed to compensate for the amount of moisture present in the aggregate at any given time. With this equipment it is claimed that variation in the water content of batch after batch of concrete does not exceed ¼ of 1 percent. As Mr. Miller pointed out, close control of water content was particularly necessary on this job, since Haydite, like any other concrete, loses strength rather rapidly if it is too wet, and becomes very difficult to place properly if it is too dry.

• An automatic dispenser adds the required amount of a cement-dispersing agent to each batch of materials. The admixture is in solution.

Pozzolith is delivered to Goff-Kirby by The Master Builders Co., who manufacture the material, and whose main offices and laboratories happen also to be located in Cleveland. It is dissolved in water and stored in two 500-gallon steel tanks, located in a small building adjacent to and connected with the plant boiler room. The material is measured out by an automatic dispenser in the proportion of 0.9 of a pound (dry weight) per sack of cement. A dial adjustment on the front of the dispenser (see cut), which is located beside the batcher control levers, enables the operator to quickly vary the amount of the admixture in accordance with the size of the batch. The dispenser tank is refilled automatically from the main supply tanks after each operation.

Two Leffel boilers, one 60 hp. and the other 40 hp., are operated at the batching plant for heating water and aggregates during cold weather operations. This was an important consideration on the Halle Brothers project, since most of the concrete has been poured in subfreezing temperatures. Every effort has been made to heat the materials at the batching plant sufficiently to insure that the temperature of the concrete at the time it is poured is not less than 70 degrees F.

Goff-Kirby has a fleet of 40 mixer trucks in operation at present. In addition to thirty 3-cu. yd. units, there are five of 2-cu. yd. capacity and five of 4 cu. yd. capacity. Thirty-eight of the units carry Jaeger mixers, while the remaining two (both of 2-cu. yd. capacity) carry Rex and Smith mixers.

Concrete requirements on the Halle job range from 28 to 30 cu. yds. per hour, since the practice is to pour half a floor, or approximately 250 cu. yds. at a time. To keep pace with this sizeable requirement, four 4-cu. yd. and four 3-cu. yd. mixers are normally assigned to the project, giving a delivery of 28 cu. yds. per round trip. The entire haul is made through heavy urban traffic. The trucks do no mixing in transit, and the water addition is made only after the trucks are on the job. This practice assures the minimum lapse of time between completion of mixing and actual pouring of the concrete.

Indicative of the rigid controls maintained at every stage of the production of concrete for this job is the practice of making test cylinders on each day's pour. Sufficiently large samples are taken to provide for not only the conventional 7-, 14-, and 28-day test cylinders, but usually for 60-day specimens as well. All testing activities are carried on by the James H. Herron Company.

This entire project strikes us as an uncommonly good example of the great flexibility and range which modern technology has imparted to concrete, making it one of the most adaptable and versatile materials in the entire construction field. Not so very many years ago it would have been necessary to arrive at some compromise between the cus-

(*Continued on page* 192)

• One of the 3-cu. yd. truck mixers delivering Haydite concrete at the job.

American Concrete Pipe Assn. Finds New Orleans Ideal Convention City

another ON THE SPOT report

THE 40th annual convention of the American Concrete Pipe Assn. at New Orleans, La., on March 11, 12 and 13, 1948, was voted a huge success by the nearly 200 producers and almost as many ladies who attended. Some came from as far away as Puerto Rico and Hawaii, and nearly every state was represented. The unusual weather which prevailed affected the business matters on the program not at all and it also failed to dampen the enthusiasm for the various forms of entertainment available, such as a yacht ride along the waterfront in the *Good Neighbor,* the official yacht of the Dock Board of the Port of New Orleans. This ride was originally planned for 85 people but so many wanted to make this trip that a second was made with a capacity load in spite of the near-freezing weather. Other trips through the suburbs, where water was still standing from one of the worst flash floods in the city's history, made it evident that New Orleans has need for much more sewer pipe than it now has underground. Other features were visits to famous restaurants and gardens, and there was a well-planned program for the entertainment of the ladies.

At the opening meeting President E. L. Johnson (Concrete Conduit Co., Colton, Calif.), after outlining the objectives and progress of the association, warmly commended the membership for its cooperation in helping along the various projects of the association during the two years he was in office. Secretary G. B. Denham (Faulkner Concrete Pipe Co., Hattiesburg, Miss.) announced that the association is soon to have a full-time assistant to Howard Peckworth, managing director.

Mr. Peckworth, in his report, said that the production of concrete pipe in 1946 was about 5,000,000 tons and that about the same amount was made in 1947. The 1948 volume, he said, may fall off somewhat, but no radical change is foreseeable and the industry should enjoy good business for years to come. Mr. Peckworth also emphasized the subject of research, telling of the six different research projects into which the association had entered in the past year, covering nearly every phase of pipe utilization. He also told of the advertising and promotional program of the association which is being carried along in cooperation with the Portland Cement Assn.

• Past President Elmer L. Johnson welcoming J. A. Dunn, incoming president, who took office for the ensuing year.

Mr. Peckworth also told of studies at the St. Anthony Falls Hydraulic Laboratory at St. Paul, Minn., where culvert research is being carried on, and at the University of Illinois, where the surface drainage of highways is being studied. He reported that the U. S. Army Corps of Engineers has allocated $10,000 for similar studies on the design of mixes, methods of manufacture, and the quality of concrete produced by various manufacturing methods.

One of the speakers, Herbert E. Cooks, chief of the concrete research division of the U. S. Waterways Experiment Station, pointed out the savings which can in many cases be made through the careful design of a mix. He said that too often needed research is postponed as being too costly or too slow, but it has been proved that the benefits derived from research, both in improving quality and reducing cost, far exceed the cost of such studies. He also said that the introduction of air entrainment has given some the impression that no further research is needed on this subject. Because of the wide variation in the durability of air-entrained concrete, he said the Corps now requires that any material prepared for use as an air-entraining admixture must cause a great improvement in the resistance of the concrete to freezing and thawing, must reduce the tendency of the wet concrete to bleed, and must cause no reduction in compressive or structural strength.

Another speaker, Harry W. Easterly Jr., production manager of the Concrete Pipe and Products Co., Richmond, Va., said that industry members should unite their efforts in finding improved designs of concrete and methods for manufacture. Questions which need to be solved, he said, include the ideal mixture time for various mixes, effects of type of cement in the finished concrete pipe, effect of the specific gravity of the aggregates, and proper methods of bedding,

• The new officers for the current year: E. H. Eby, third vice-president; H. W. Heath, first vice-president; J. A. Dunn, president; C. H. Bullen, treasurer; G. D. Denham, secretary; C. J. Kelly, second vice-president.

backfilling and distribution of the load to the installed pipe.

Other technical papers presented at this meeting were: *The Development of Metropolitan Atlanta's Sewerage System* by Clarke Donaldson, Chief of Construction of Atlanta; *Master Plans Essential for Modern Highway Program* by F. Elgin Bayless, chairman of the State Road Dept. of Florida; and *Grading of Aggregates for Machine-Tamped and Vibrated Pipe* by Cotton W. Howard, engineer, Concrete Products Assn. of Washington.

One afternoon was devoted to a jam session or open forum, which was just as popular as those of the many other conventions attended by PIT AND QUARRY editors. In charge of this meeting and ably leading the discussion was E. H. Fox (Cincinnati Concrete Pipe Co., Cincinnati). Among the many important subjects covered were weathering of concrete under various weather conditions, air entrainment, admixtures and their contribution to durability, cement types and their contribution to durability and resistance to chemical action, etc.

Safety was discussed in several phases. Some of these phases were general; others specific to the surroundings of pipe-making plants. Some had to do with protection against financial losses due to accidents, and still others with respect to medical investment as a loss-preventive measure. All were useful angles offering many advantages for those plants that elect to make use of them.

One safety principle propounded involved the use of medical attention to any injury, no matter how slight. This obviously meant a high-frequency, but low-severity accident rate, with a resultant financial saving over all.

The making of concrete drain tile with block machines was also talked about. Some claimed that the smaller sized tile was more easily and profitably made on a vibrating block machine with proper molds. The added claim was made that the pipe thus produced was more profitable than were blocks from the same machine.

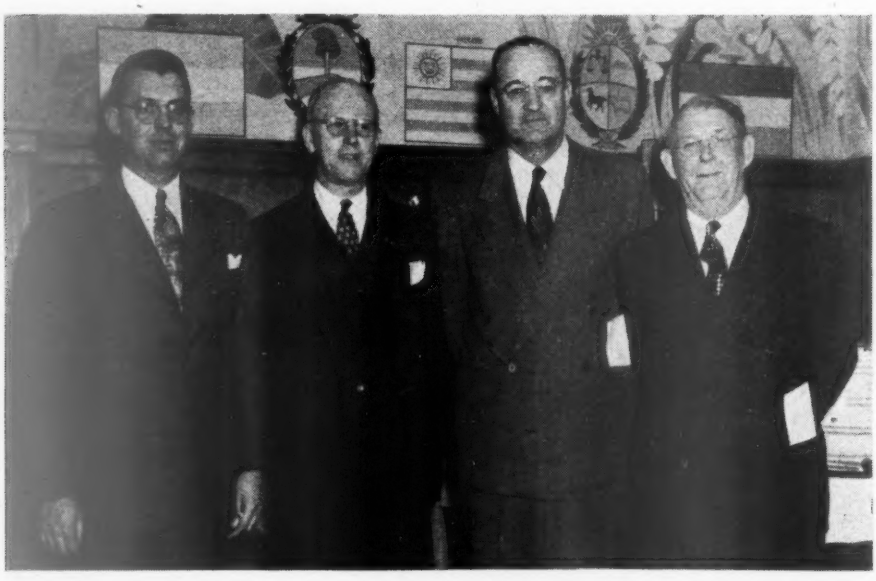
The suggestion was made that farm tile be eliminated from the drain tile "specs," because it was not uniform in quality with other classes of tile.

The subject of pH values was discussed. These values were felt by some to indicate the possible speed of deterioration and disintegration. Pipe coatings were talked about as barriers to the inroads of disintegration and deterioration.

Lack of space prohibits relating any detailed conclusions arrived at on the many points noted above, but those who heard and came away will no doubt make many changes in their own procedures as a result of information gained at these sessions.

The convention closed with a meeting of the newly-elected board, and a surprise party and banquet. The newly-elected officers are: president, J. A. Dunn, Hume Pipe of New England, Swampscott, Mass.; first vice-president; H. W. Heath, Lock Joint Pipe Co., East Orange, N. J.; second vice-president, Claude J. Kelly, New Orleans Cement Co., New Orleans, La.; third vice-president, Earl H. Eby, Elk River Concrete Products Co., Elk River, Mont.; secretary, George Denham, Faulkner Concrete Pipe Co., Hattiesburg, Miss.; treasurer, Claire Bullen, Midwest Concrete Pipe Co., Chicago.

The next convention of the Association is to be held in Richmond, Va.



• The new directors, who will serve until 1951: H. S. Price, H. F. Peckworth (managing director), Elmer L. Johnson, and Harry Easterly.

Lightweight Ready-Mix

(*From page* 190)

tomer's needs and the structural problems encountered. It is worth noting that with no sacrifice in the strength of the concrete, it was possible in this instance to effect approximately an 8,000-ton reduction in the total column loads. The Haydite concrete ranges in weight from 98 to 102 lbs. per cu. ft., against close to 150 lbs. for most sand-and-gravel concretes.

Architects on the Halle Brothers job are Walker & Weeks, and Sam W. Emerson Co. is the general contractor, both of Cleveland, Ohio.

Terry Carpenter to Try for Senate Seat in Washington

Terry Carpenter, who operates one of the largest and most modern concrete products plants in Nebraska, along with a sand and gravel business and other enterprises in and near Scottsbluff, has filed as a candidate for United States senator from Nebraska. He received the indorsement of the Nebraska Democratic pre-primary convention at Omaha recently.

Indiana Block Manufacturer Develops Wearproof Units

A formula for wearproof, fadeproof colored concrete blocks has been developed by Dan Patterson of Franklin, Ind., who is currently turning out experimental types of block at his plant. He states that eventually it will be possible to make colored blocks in several shades and in 50 different designs.

After conducting a concrete block business for 25 years, William Vander Wall and sons have sold their plant near Spring Lake, Mich., to Mr. and Mrs. F. J. Kieft of Grand Haven. The Kiefts will retain the name of Vander Wall Cement Block Company.

Walter J. Higgins, consulting engineer, recently was appointed sales manager of the Smithwick Concrete Products Co., Portland, Ore. He succeeds Aubrey M. Baker, who was transferred to the company's Eugene plant as vice-president and general sales manager of the Insul-Lite Block and Supply Co.

Guy Miller of Beaver Crossing, Neb., has started construction of a $30,000 plant at Seward, Neb., for making ready-mixed concrete. The plant is scheduled to begin production about May 1.

Maintenance Practice with Hard Facing Welding and Chromium Plating

By J. C. EHLE
Production Manager
Cleveland Builders Supply Co.

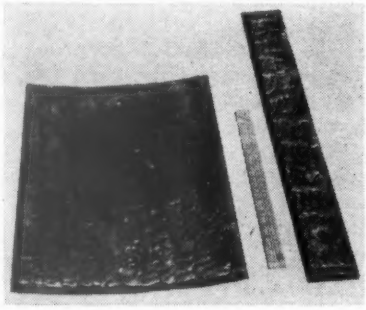
AT LAST year's meeting of the National Concrete Masonry Association a paper was read by Mr. Ralph Reiner of Cleveland Builders Supply Company on the use of hard alloys applied by welding to metal surfaces for the purpose of resisting wear. This is technically known as hard-facing. That paper dealt mainly with the economy of hard-facing as directly related to our industry. This year it is the intention to discuss briefly the technical aspects of hard-facing welding, stressing the procedures which have been developed during the last year for hard-facing various types of equipment.

The average plant will find it economical to purchase an arc welding machine and to have a trained operator who is immediately available and equipped in the event of breakdowns where welding can be used. We have found it practical to train two of our regular plant mechanics in the fundamentals of fabricating and hard-facing welding. A service representative of one of the leading manufacturers of hard-facing welding rods has cooperated with us in our training program.

An arc welding machine with complete accessories, which will be capable of handling the heaviest welding assignment, may be purchased and fitted today for less than $700. In purchasing a welding machine it is important to select one with adequate capacity as various jobs require different welding heats. It is an accepted fact that a motor generator type arc welding machine with a rated capacity of 300 amperes at 40 volts generating d.-c. welding current is a suitable machine for general plant maintenance welding. In most cases the large transformer type a.-c. welding machines are also satisfactory for this work.

Oxy-acetylene apparatus has its use in concrete masonry plants but its use is generally limited to the flame cutting process in facilitating equipment repair. The use of oxy-acetylene torch welding is generally outmoded by the cheaper and faster electric arc welding methods.

Electric arc welding is not only more economical than oxy-acetylene torch welding but is much more practical in its ease of application and the training of operators. A skilled electric arc welding operator may be developed from your plant personnel in a fraction of the time required to train an oxy-acetylene welder.



• Batch mixer bottom liners protected by an overlay of hard-facing metal. Note the size by comparing with the 12-in. rule.

As most plant operators are familiar with the use of welding for ordinary repair or mending of broken parts and the fabrication of new parts, such as curing racks, etc., I shall limit my discussion to hard-facing welding, the principles of which are not so well known. It is my intention to deal here mainly with methods and procedures involved in typical hard-facing applications rather than with results obtained, as I consider that the economy of these applications is already well advertised.

The factors for consideration in any hard-facing welding job are as follows and will be discussed briefly in this order:

No. 1 The hard-facing rod
No. 2 The various base metals commonly found in parts to be hard-faced in our industry
No. 3 Procedures, jigs, etc.

The hard-facing welding rod may be obtained from a number of suppliers. Its selection should be made with considerable care as the success of the hard-facing application is primarily dependent upon the ability of the hard-facing alloy to withstand the service to which it is being subjected. It is important to bear in mind that the wear problems found in our plants are among the most severe known due to the types of aggregates used in the manufacture of masonry units. Experience has shown that the best results have been obtained with the cast high-alloy, high-carbon type of hard-facing welding rods, rather than the less expensive types of rolled low-alloy, steel-base welding rods. This high degree of wear resistance found with the cast high-alloy hard-facing welding rod is due to the mass of immeasurably hard carbides contained in the hard-facing weld overlay, which are not present in the weld deposit from the inexpensive low-alloy variety of rods. When possible, it is advisable to consult with a qualified hard-facing welding engineer before undertaking new applications.

Hard-facing welding rods are made in sizes from 3/16-in. up to 5/16-in. diameter. Where the base metal to be hard-faced is very thin, such as a plow edge on a dry pan crusher, or the strike-off leading edge, the smallest diameter rod available is desirable for best results. On the other hand, where large surfaces with heavy sections are to be hard-faced the largest diameter rod that your welding machine is capable of handling is the most economical. For instance, 30 percent more area may be hard-faced using 5/16-in. diameter rods in a given period of time than that hard-faced using a ¼-in. diameter rod. The thickness of the overlay will be essentially the same. As attendant labor costs are sometimes a large factor in determining the economy of the hard-facing application, the most economical hard-facing welding rod diameter is very important.

The various base metals commonly found in parts to be hard-faced in our industry are chilled cast iron, specialized varieties of low-alloy cast iron and cast manganese steel. All of the above materials may be successfully hard-faced if certain common-sense procedures are followed in applying the hard-facing overlays. In all cases it is very important to keep the welding heat which is accumulated in the part at a minimum and well distributed throughout the part so that no section becomes excessively overheated causing uneven expansion, which would result in breakage. This is accomplished by skip welding, or intermittent welding, which will be discussed later. Actually these hard cast parts are made up by manufacturers with the

*Presented at the 28th Annual Convention of the National Concrete Masonry Association, March 2, 1948.

intention of giving better wear resistance than soft steel parts and no particular consideration has been given to their suitability as a base metal for welding. Therefore, extreme care must be taken by the welder to distribute his welding heat so as to avoid damaging the cast part.

In this connection, it is sound practice to have the part made of a weldable base metal such as mild steel or even medium carbon steel. Base metals of this type will provide the structural shape of the part and withstand the heat shocks of welding without breakage. Preheating of the part and maintaining it at a very high temperature while welding is recommended only where the base metal is of a very high carbon content—that is, .70 percent carbon and over. In this case it is important to maintain a high heat in the base metal of approximately 800 deg. F. prior to, during and immediately after welding; otherwise spalling of the hard-facing welding overlay may occur. In hard-facing cast manganese steel parts the general rule is to keep the heat accumulated from welding at a minimum and well distributed in such a manner as to permit laying the hand near each weld after it is deposited. This means simply keeping the manganese cast part cool so as not to upset the critical heat treatment of the casting, which would destroy its toughness and make it brittle in service.

Procedures, jigs and layout work are extremely important although a standard procedure for all types of base metals and shapes is difficult to arrive at. Procedures may vary, depending on the shape or size of the part being hard-faced. I have already mentioned skip welding to distribute the heat of welding evenly throughout the part and in this connection will only emphasize the importance of welding from the thicker sections of a cast iron part to the thinner sections, rather than the reverse. This allows the thicker section to come to the permissible low heated value by the time the weld is applied to the thinner sections or edges. If only the thin edge of a chilled cast iron part is to be hard-faced, it is desirable, if possible, to preheat the entire part to approximately 500 deg. F. prior to welding. The direction of the weld deposit bead should be parallel to the edge and not from the edge in towards the thicker section. In applying hard-facing welding rods the proper procedure is to weave the rod in such a manner as to obtain a pad of the hard-facing material approximately ¾ in. wide and ⅛ in. thick, well bonded to the base metal. In applying successive beads the weave of the rod should carry into the previous bead or pad in such a manner as to blend smoothly and not leave unsurfaced areas or blowholes. The part being hard-faced should be so mounted or positioned that the immediate area to be covered is in a flat downhand position. This facilitates sound fusion and makes possible a uniform blending of the weld deposits. Where the part is subjected to severe impact in service—as in roll crushers, dry pan tires, hammermill hammers, etc., single pass or thickness of hard-facing overlay only is recommended. In service where abrasion is the wear problem, and no severe impact is involved, the hard-facing may be applied in two overlays or layers to a maximum thickness of ¼ in. It has been found that the addition of a second layer of hard-facing alloy more than doubles the ultimate life of the overlay.

When hard-facing thin sections—as in bottom liner plates for batch mixers, it is found that warpage due to the heat of welding becomes a major problem. Jigs and procedures have been successfully developed to offset or control this warpage so that it does not affect the liner's final required shape. As batch mixer bottom liners and blades wear rapidly and replacement parts are expensive, a description of hard-facing procedures on these parts will be given here.

There are two principal types of batch mixers in general use. The blades in each are essentially the same for the purpose of hard-facing, while the bottom liners differ entirely in shape. One type has liners resembling staves in shape which are 3 in. wide, ¾ in. thick and approximately 7 ft. in length. The other has square and oblong shaped plate liners roughly 12 in. by 14 in. by ¾ in. in thickness. We will discuss the hard-facing procedures and jig required for the stave type first.

Base metal is important here when considering hard-facing, and in lieu of the high carbon liners furnished by the manufacturer which are subject to breakage under welding and straightening, it is recommended that milk steel stock of the proper width and length be obtained. If welded in a free position the warpage from the welding heat and the shrinkage of the weld deposit will bow and twist the liner into such a shape that it cannot be installed in the mixer barrel. A sturdy jig must be built to hold the liner rigid during the welding and quenching periods. A jig can be cheaply constructed from a heavy beam or channel which should be approximately 12 in. longer than the liners. The jig serves two purposes: (1) to prevent the twisting of the liner from its straight shape, which is necessary for close fitup with the other liners in the mixer barrel; and (2) to prevent the liner from bowing so that it will not lie flat and toe under the end liners when installed. The twisting of the liner is prevented by welding to the working surface of the jig a series of alignment blocks laid out to the exact pattern of the straight liner shape. These alignment blocks should be approximately 6 in. long and spaced about 6 in. apart in opposite positions along the length of the liner. The bowing of the liner will be offset by clamping it in position between the alignment blocks prior to welding. Clamping is used only at the two ends of the liners using either large "C" clamps or bolt and cross piece brackets. No hard-facing alloy should be applied to the last half inch on either end of the liners in order that they may readily be toed under the end liners. The hard-facing welding metal is then applied to the liner weaving deposits from 1 to 1½ in. wide. A skip welding sequence is recommended to minimize the effects of the warpage from the welding heat and shrinkage. While the completed liner is still clamped rigidly in the jig and hot from the accumulation of the welding heat it should be immediately quenched out cold by the direct application of cold running water. This will fix the alignment as located by the blocks and when removed from the jig it will be found that the liner is practically flat. Minor adjustment or flattening can be easily accomplished by applying a little leverage to the liner as it is held lengthwise in a vise.

At our products plant, because of the natural high abrasiveness of the slag type aggregate used, conventional high-carbon liners are worn completely through in an average period of three months' use. Recently a set of hard-faced liners from the discharge door was inspected after 20 months' service and was found to be in excellent condition with almost half of the original thickness of the hard-facing overlay remaining. As a result of this trial we have hard-faced the bottom liners of all of our batch mixers.

The hard-facing of the plate type liner presents a different type of warpage control problem. These liners are of square and oblong shapes with a definite radius formed to conform with the radius of the

mixer barrel. Present liner plates are furnished by the manufacturer are of a cast material and not weldable due to the tendency of breakage from the welding heat. Therefore, a method has been developed whereby weldable liners may be easily made. This involves starting with a flat mild steel plate cut to the proper size for a liner and drilled for bolt attachment as required. The plate is of 5/8-in. thickness to accommodate the 1/8-in. thickness of the hard-facing alloy operlay for a total thickness of 3/4 in. Instead of using a jig to prevent warpage the plate is hard-faced in a free position making use of the warpage to form the radius required in the liner plate. By starting the welding along the two outside edges that will be parallel to the axis of the mixer barrel and welding from either side in turn towards the center of the plate with the weld deposits parallel to that the plate will assume a radius near that required for fit in the mixer barrel. By use of a simple jig conforming to the finish radius required, the plates, while hot from welding, may be easily hammered into the final shape desired.

While the batch mixer blades offer no particular problem from the warpage angle, it is still advisable to skip weld conscientiously to offset chances of breakage due to local heat concentration. This means a positioning problem with a part that weighs on the average approximately 300 pounds. Ordinarily, this would involve two men on the job—one welding and the other assisting in positioning. The operation is further complicated by the curved face of the blade. To overcome this obstacle and make it possible to hard-face the blade using only one man, the welding operator, a simple arrangement may be made as follows:

Place two long bolts through the bolt holes of the blades in such a manner that a chain can be securely attached on the face side of the blade. Attach one of these chains to a roof beam so that the end of the blade will be about three feet above the floor level. To the other chain attach a chain falls. With this arrangement and a saw horse for final positioning the welding operator may easily lower or raise the blade positioning all areas to be hard-faced quickly and with ease. When hard-facing the cast iron blades, it is important to run the direction of the Hard-face overlay beads *with* the length of the blade instead of across the blade. When re-welding or re-surfacing a batch mixer blade or other parts used in contact with the concrete where the cement has penetrated the surface in cracks and holes, it is found that welding is difficult and sound dense welds are hard to obtain. This condition can be corrected by washing the surface to be welded with muriatic acid and after a period of approximately 10 minutes rinsing off the surface with clear cold water. Sound weld deposits may then be easily obtained.

Another real money saver in plant maintenance is the use of hard chrome. This is not to be confused with the chrome which is used on automobile bumpers, etc. This hard chrome is used very effectively on cores and mold box liners and pressure-heads; and in general when applied correctly, makes a mold box last approximately four times as long as an unplated box. This will vary, of course, depending on the aggregate. At the end of that time it may be replated.

Chrome gets its value from two facts: first of all, it is one of the hardest of all metals; second, its coefficient of friction is 4 percent less than steel.

The biggest saving in the use of chrome plated boxes is the tremendous saving in material which, with one high-production machine making 600 8-in. block per hour, could amount to from $10 a day (with a low cost material), to as high as $30 (with the more expensive lightweight aggregates).

In general .010 of an inch of chrome is the equivalent of 3/8 in. of steel in abrasive resistance.

New mold boxes to be plated shrould be run for a few days to assure a smooth surface, as chrome has an affinity to pick up on any slight burr or irregularity. The boxes should also be taken apart, as it is difficult to apply an even coating in a corner.

Chrome is deposited on a part at the rate of .001 of an inch per hour and most plating should be .010 to .012 of an inch in thickness.

The cost of plating is small when you figure what it will save or the cost of new liners and cores. The cost of plating a set of cores is about one-third the cost of a new set. It is extremely important that a reputable firm do this work.

In conclusion I want to stress the hidden maintenance costs which exist in a products plant. In bad years they can mean the difference of a profit or loss, and I feel that the use of wear-resisting metals in hard-facing and hard-chrome are very important in reducing these costs to the minimum.

The Lincoln Hollostone Company has completed installation of a new plant at a former Army air base seven miles northwest of Lincoln, Neb., and adjoining the Lincoln Municipal airport.

• Left: The batch mixer blade conveniently positioned for hard-facing on a one-man operation.

• Below: A chilled cast-iron crusher roll from a two-roll crusher in the process of being hard-faced.

Simplified Bookkeeping—An Indispensable For Solvency Insurance

By BETTY LEE GOUGH

THE U. S. Department of Commerce recently made a study of business failures in St. Louis, in which the reasons behind the failures of 30 small companies were analyzed. Of the 30, only two had kept accurate books to tell them whether they were making or losing money, and which operations were profitable, which unprofitable.

Until bankruptcy was upon them, many of these firms did not know that they were losing money. Had they kept simple but accurate books, they would have known in advance that business was not good. Knowing this, they could have found the factors that made it bad, and perhaps corrected them.

To be sure, each of these firms had kept records of a sort. Often, they were no more than notebook notations of cash pay-outs and receipts. Such records indicate nothing. A simple system of true bookkeeping, which is only a little more trouble to keep, could have warned these businessmen of approaching failure, perhaps in time to do something to avert it.

While bookkeeping is no guarantee of certain business success, in every study made of business failures a lack of it glares out like a neon sign.

In addition to telling when and where the company is making money and warning of unprofitable operations, bookkeeping is a must for income tax purposes. Section 54 (a) of the Internal Revenue Code provides that "Every person liable to . . . tax . . . shall keep such records . . . as the commissioner, with the approval of the Secretary of the Treasury, may from time to time prescribe." The commissioner's ruling in turn calls for business men to "keep such permanent books of account or records, including inventories, as are sufficient to establish the amount of the gross income and the deductions, credits, and other matters required to be shown. The books of records shall be kept at all times available for inspection by internal revenue officers."

Hundreds of concrete manufacturers and other business men miss out on legal deductions because they do not know the expenses that can be taken off their returns, nor how to deduct them.

Basically, four kinds of records are necessary to the successful operation of a concrete plant: sales records; records of credit operations and cash sales controls; expense records; and special sales, income social security and withholding tax records.

Sales records are not merely figures showing how much business was done today and how much yesterday; they constitute a tool with which to estimate how much will be rung up tomorrow. They show when volume is slipping. They show where it is slipping. They also show when and where volume is gaining.

It can all be kept simply in one book—along with the other records necessary to the operation of a concrete plant. Only a few minutes' work needed each day. Let's look at the book on which all of these records can be kept.

At the end of the day the total sales and the cash and credit transactions should be tabulated and transferred to the main control sheet.

At the end of the month the columns are added and a total sales figure for the month, as well as cash and credit figures, are discovered. Besides showing how much business was done, these indicators tell the concrete manufacturer how his business is going.

Is business as good as last year? Better? A comparison of the figures for two months a year apart tells this. If sales have fallen off, it's a good indication that better selling tools must be put to use.

Sales records, however, are only a part of the picture. There are other things the concrete manufacturer should know about his business. Are you making money on credit sales? How many "slow" accounts are there on your books? How much is owed to you—and is it a healthy or an unhealthy percentage of your total sales? How much can any given customer carry? *How much credit can your firm profitably carry? Are you undercutting it, hitting it on the nose, or exceeding it?*

Many concrete manufacturers have failed because they carried too much credit. An accurate record would have warned these operators that trouble was coming and would would have told them, moreover, where the trouble was.

The average concrete manufacturer can afford to carry very few "slow pay" accounts. Consequently, the records must show the complete status of each customer's account, so that accurate controls can be kept on his credit.

If credit sales during the week amount to more than collections—as shown immediately by the one-book control sheet—an effective stop-light warning has been flashed. It is time to watch carefully the next two weeks.

If the *trend* of credit selling is fewer collections than dollar sales, it is time to take steps to put the credit ledgers on a healthier basis.

Credit records are simple to keep. Insistence on seeing that the totals are promptly and accurately entered first on the customer ledger, second on the master control sheet, is the secret. The ledger insures that credit purchases will be billed promptly and properly; the control sheet tells the concrete manufacturer the status of his credit selling business at any given time.

The ledger should indicate: (1) date of sale and date of work completion; (2) the total to date; and (3) credits, so that a complete statement is available at all times.

Credits, like charges, should be entered at the end of the day on the master sheet. An easy way to do this is to issue receipts in duplicate, keeping the carbons with sales slips.

Expensive equipment is often purchased on long term credit. The Department of Commerce, in an advice book, points out, "You should know what your costs are on your present equipment. These costs should be stated as so much a year, and should include annual repairs and maintenance (for example, the electricity required if any), and each year's proportionate share of the original cost. An estimate should also be made of these elements of expense for new equipment."

Computing depreciation on these fixtures is simple. Take, for example, a machine which cost, let us say, $1000, and which is expected to last for five years. At the end of that time it is estimated that the machine will have a trade-in value of $100.

Dividing $900 by five years, the expected life, we get $180. That is the annual depreciation. At the end of one year the investment is $720; at the end of two years it is $540; at the end of five years it is zero.

It is necessary to know how to fig-

(*Continued on page* 198)

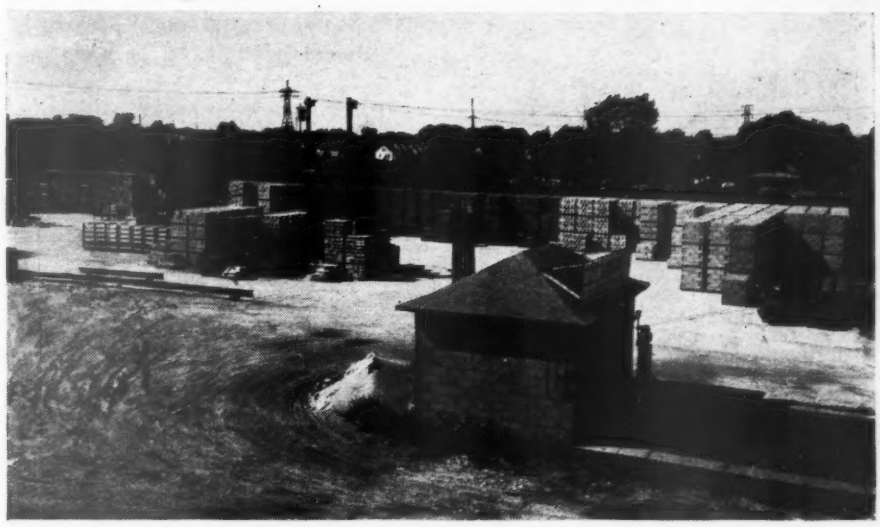
CUBING ON SKIDS EFFECTS IMPORTANT ECONOMIES FOR EASTERN BLOCK FIRM

another ON THE SPOT report

AN interesting and provocative variation on the technique of cubing came to our attention some months ago when we visited the Linton Concrete Products Company's plant at Tonawanda, N. Y. Cubing has unquestionably made a permanent place for itself in the products industry on the basis of handling economy alone, but this concern has gone a step further by developing a method which also improves the quality of the delivered product.

This extra dividend is obtained by cubing the units on pallets, with all the cores in vertical alignment, so that the core spaces may function as flues to expedite drying of the units on the storage yard. Although comparative test data were not available when we visited the plant, we were told by Franklin L. Kiphuth, manager, that this practice has resulted in material reduction of the moisture content of delivered units, and that customers are well pleased with the drier units which they have been receiving since the practice was adopted.

The pallets (or skids), measuring 40 inches square, are of wood construction, with 1-inch plank decks nailed to 3 three-by-four sleepers. Sixty 8- by 8- by 16-inch units (or equivalent) are cubed on each skid, with 12 units in each course. The corners are interlocked so that cubes will remain intact even under extremely rough handling on the delivery trucks. About 2,000 skids, with a total capacity of 120,000 8-by 8's, were purchased when the system was adopted in June, 1945, and up until a few months ago there had been no occasion for making replacements.

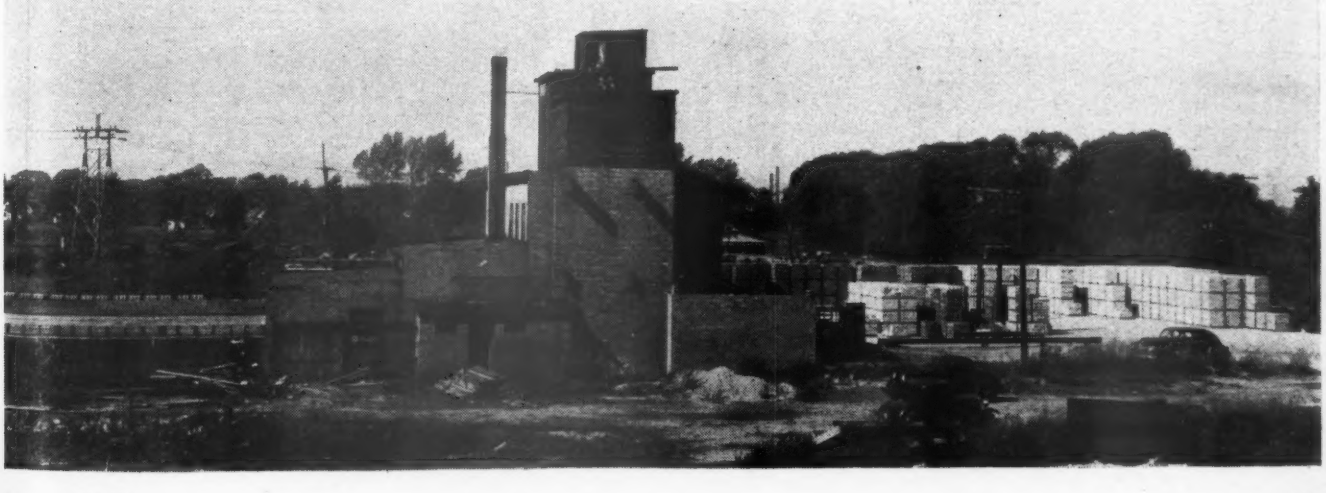


• This view of the Linton storage yard, with the plant office in the foreground, shows the exceptional neatness that can be achieved with cubing.

• A general view of the Linton Concrete Products Company's plant at Tonawanda, N. Y. One of the conspicuous features of the plant is the unusually large paved storage area—164 feet wide by 297 feet long.

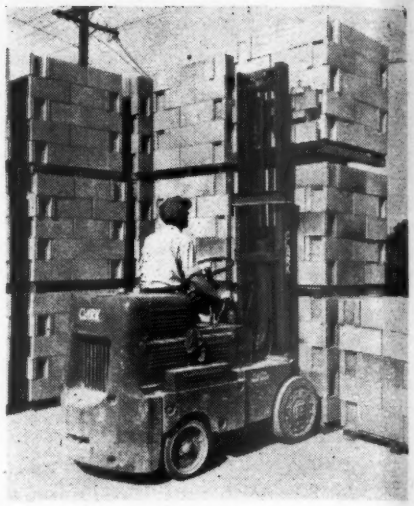
The Linton company operates a Besser Super Vibrapac machine, turning out units at an average rate of 570 per hour. Even with this high production two men are able to stack and cube an entire day's output. The racks are transported by lift truck from the curing kilns to the paved storage yard, where they are spotted in a straight line, end to end. Since the racks hold 60 units each, one skid is placed on the pavement adjacent to each rack. For a short period the company experimented with a yard hoist (designed and built at the plant) for cubing operations, but it proved to be considerably slower than hand cubing. With two men working, the cubes can be formed at the rate of about ten an hour, which is more than adequate to keep up with production.

The company operates two Clark Tructractors, both high-lift, solid-tired units. One machine operates constantly in the yard and the other in the plant. A similar pneumatic-tired machine was ordered some time ago for yard use and may now be in service. When the yard lift truck is not engaged in loading delivery trucks, it picks up the freshly cubed units and stacks them in neat piles three cubes (or 15 courses) high. Not the least important of the several advantages inherent in this method of handling is the neat, orderly appearance it gives to the storage yard. The stacked cubes give a pleasing, business-like, geometric pattern to the surroundings of the



• Left: Two men strip and cube the units at the rate of 600 (or 10 cubes) per hour. Cubes are made up in five courses, each containing 12 standard units. Corners are interlocked to obtain increased stability.

• Right: High-lift fork-trucks stack the cubes three tiers high for additional yard curing and drying before they are loaded on delivery trucks.



Linton plant (see cut). As compared with the ragged appearance of many block storage yards, we suspect that the neatness gained by cubing could scarcely fail to have a definite advertising value.

The cost angle, of course, is the primary consideration in determining whether or not to cube. Before the practice was adopted at the Linton plant, it took two men 1 to 1½ hours to load 360 units on a flat bed truck. Loading trucks out at an average rate of 13 per day, this consumed in excess of 30 man-hours, allowing an average of 1¼ hours per truck. In contrast with this, trucks can now be loaded with cubes in about 6½ minutes. A natural by-product of this sharp reduction in loading time is that trucks can now make four to five round trips (averaging 12 to 14 miles) per day, as against about two trips under the former system.

The objection may very well be raised that the introduction of pallets into the cubing technique enpense, and also exposes the block producer to the headache of getting the pallets returned from the job. From the expense standpoint, Mr. Kiphuth told us, the cost of the skids (about $2.75 each at the time they were built) may be written off after one trip. With reasonably careful handling it would appear that the skids have a useful life of at least three years and possibly longer —surely not a bad performance for an item that pays for itself the first time it is used. To date the problem of getting the skids back from the job site has not presented any serious difficulty. With sufficient skid capacity for a full month's production of the plant, it matters very little if a few of the units remain in circulation.

When it is necessary, as many as six trucks can be loaded simultaneously in the yard of this plant, an advantage which the company's customers fully appreciate. Since most deliveries are made by the customers' trucks, the reduction in loading time becomes an especially important factor in building good will.

Simplified Bookkeeping

(*From page* 196)

ure depreciation on fixtures in order to make up the year-end profit-and-loss statement upon which income tax payments, among other things, are based.

There is one last item which must be entered on the important control sheet before figuring the profit-and-loss statement. This is wages. The record should show: the gross wage paid; the amount deducted for federal old age benefits; the sum (if any) taken out for state social security; the income tax withheld from wages; and the net salary.

The amount which is entered on the final profit-and-loss statement is the gross wage paid. However, the other information is necessary in filling quarterly social security and withholding tax returns for the Collector of Internal Revenue. Lack of detailed knowledge of shop expenses and of legal deductions has resulted in overpayment of federal income tax on the part of many a concrete manufacturer. Others have taken deductions to which they were not entitled, or which they could not prove by book entries. The result for the latter firms was usually a 6 percent interest charge—and sometimes penalty assessments as well.

Aside from the fact that it simplifies the filing of tax returns, and accurate profit-and-loss statement is an indispensable tool. It tells not only how much was made or lost, but where it was made and what expenses cut down the net. Essentially, the profit-and-loss statement is no more than a condensation of the year's records. It can be taken entirely from the monthly master control sheet of the one-book bookkeeping system.

This is what a profit-and-loss statement tells you: the net sales and other income. This gives the *gross* income.

From this figure the following are subtracted: wages, rent, utilities, telephone, supplies, repairs, depreciation, advertising, bad debts, cash shortages, taxes and licenses, and miscellaneous expenses such as freight and express. The amount left is the net profit for the year.

These entries, transferred to the income tax form, give Uncle Sam a clear picture of your business. The one-book system (which should be retained for at least five years) and receipts, cancelled checks, etc., are there to back up claims made on the income tax return.

What expenses are deductible from gross profits on the tax return? Which expenses are not? Supplies of every kind are expenses of the business. Postage is an expense. If you buy a broom to sweep the floor, that is a supply expense. Freight paid on shipments is deductible. Advertising, entertainment, wages (but not the proprietor's), utilities, gasoline used for delivery, bad debts, cash losses, thefts, rent, repairs, depreciation, taxes (except sales and income taxes).

Montana's 10-Year Program For Roads Tops $300,000,000

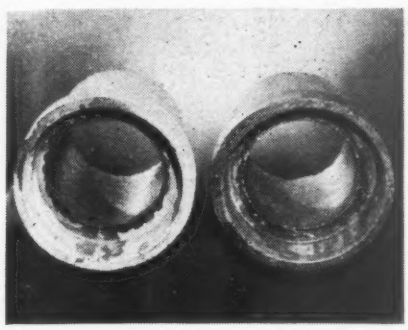
Following conferences with federal engineers, the Montana Highway Commission estimated that a suitable 10-year program to build nearly 8,000 miles of roads in Montana would cost $334,970,000.

Included in the program would be construction of 4,566 miles of primary highway at a cost of $250,694,000, about 3,000 miles of secondary road costing $50,096,000, about 40 miles of urban streets costing $9,180,000, and 525 miles of forest highway at a cost of about $25,000,000.

NEW MACHINERY and SUPPLIES

● Vitrifying Preparation

"Eternacote" is a transparent liquid organic chemical compound with a combined pure rubber and plasticizing resin base. When applied to concrete block, pipe, walls, or plaster, this compound forms a permanent waterproof and acid-



proof film. An Eternacote finish can be applied by brush, immersion or dipping in a vat, or by a spray gun.

For vitrifying concrete pipe the manufacturer recommends that the pipe be submerged in a bath of No. 10 viscosity primer as well as in the No. 150 viscosity finishing solution. On leaving each of the soaking vats, the concrete pipe must be dried. The drying process allows the solvents to evaporate.

Concrete pipe vitrified with Eternacote, it is claimed, will permanently protect the pipe from destructive reaction caused by sulphuric acid fumes or other organic or inorganic matters carried inside the pipe, as well as from alkalies suspended in the soil around the pipe. Manufactured by the George W. Hoffmann Corp., 121 Broad Street, New York 4, New York.

● Trucks for Low Headroom

One of the basic problems in mechanizing the handling of materials arises from the low headroom areas. To meet this problem Yale & Towne has introduced a standard model of its new lightweight, low-capacity "Zephyr" line. The modification is a short 68-inch mast—only slightly taller than a man—which has a telescopic extension to permit high tiering. It can, therefore, enter trucks or rooms through low openings and still stack goods to the ceiling.

The truck is 58 inches long and 38 inches wide and has a tilting mast.

What do you want to know about the ready-mixed concrete industry or about concrete blocks, pipes, etc.? The 1948 Concrete Industries Yearbook can probably tell you.

REDUCE MIXER DOWNTIME

Here's a proved way to triple your liner and mixer blade life

How long do liner plates last in your batch mixer? *Not long enough!*—that's the answer everywhere. Rising production costs are chewing into block plant profits.

Read what one cost-conscious plant operator has done to decrease equipment downtime . . . *increase block output.*

Liner plates wore out every three months . . . had to be replaced four times a year. Today, new liner plates are given a longer lease on life by hard-facing with Coast Metals* alloy before installation. Even after 15 months of continuous duty they are still in good condition.

Can you afford to waste money in needless maintenance costs when these savings can be yours too?

A test will easily determine how much money you can save with Coast Metals Hard-Facing Weld Rod. Regardless of aggregate composition, your liner plates and blades will last AT LEAST THREE TIMES AS LONG when protected with Coast Metals alloys.

Send for our special $3 trial package of rod No. 101 today. Your own plant welder—or any contract welding shop—can easily and quickly do the job. See for yourself *how much longer equipment lasts* when it is protected with Coast Metals alloys.

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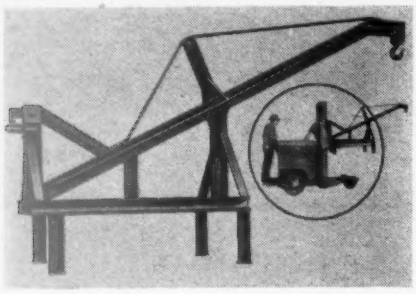
Plant and General Offices: 1232 Camden Ave., Canton 6, O.
Executive Offices: 112 East 19th Street, New York 3, N. Y.

● Boom Skid for Fork Trucks

A device brand new for users of fork or high-lift equipment is presented by the Palmer-Shile Company, 12662 Mansfield Avenue, Detroit 27, Mich. The



manufacturers of a unique boom skid point out that extremely heavy loads that are either too cumbersome or difficult to handle can now be handled with ease. The boom skid is not fastened permanently to the truck or lift. By the use of a few simple tools it is securely fastened or unfastened.

The boom illustrated measures 114 inches long (overall) with a base of 54 inches. Legs are 12 inches high, and the weight is approximately 350 pounds. The boom is constructed of heavy fabricated steel, securely welded throughout.

● Transit Mix Truck

The Concrete Transport Mixer Company of St. Louis, Mo., has recently announced its latest addition to its line of truck mixers. Their "Hi-Lo" truck mixer was designed by Everett D. Hunkins of the Hunkins-Willis Lime and Cement Company, located in St. Louis.

The truck has a stationary drum of a design resembling an octagon from a plan view. Across this drum is installed the main mixer shaft, which is made of 5-in. cold rolled, seamless tubing. To this shaft are attached the blades. The mixing assembly is cut in half and offset

as half-moon sections on the shaft. Each half has breaker bars located at intervals on the chord to provide mixing action on the drum's outer circumference.

Supporting the main shaft where it penetrates the drum is a double row of self-aligning roller bearings protected by an oil-fed packing gland. The outer drum shell is lined with a one-piece liner. Drive power is transmitted on standard installation from the truck motor by means of a power take-off to a gear reduction and then by chain and sprocket to the mixer shaft.

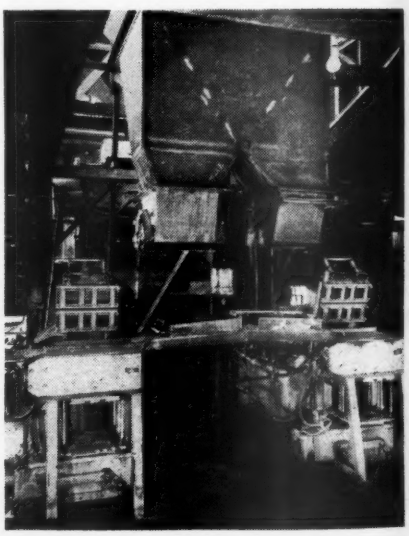
● Bitumen Additive

"Kling", described as "an effective, low-cost additive for making cutback asphalts and asphalt cements water resistant", is now offered by Thomas Robinson Company, Inc. It is available in two grades, Kling X and Kling XX.

Kling X is a standard compound, the amount to be added to bitumen varying with the aggregate to be coated. Usually from 1 percent to 2 percent, based upon the nature of the bitumen, is required to coat the wet aggregate. Kling XX is a concentrated compound. From 0.5 percent to 1 percent is considered sufficient for adequate coating. The treated bitumen is mixed with wet or dry aggregate in the usual way.

● Block Machine

The new "two-at-a-time" hydraulic powered Mortarless block machine has just been announced by the Mortarless Tile Machine Co. of Los Angeles, Calif. One



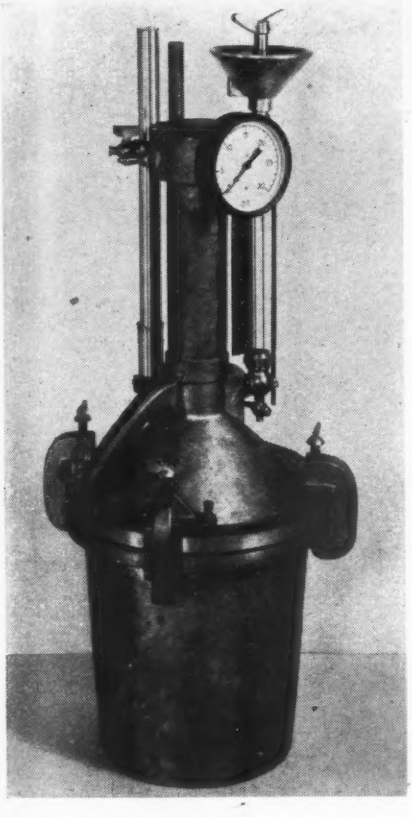
of the first plant installations is pictured above showing two of the new machines installed complete with overhead feed hoppers. The company is prepared to market the new double-capacity machines as part of a "packaged" unit together with a carefully engineered self-charging skip and concrete hoppers equipped with fast-acting butterfly gates, thus providing the complete production equipment.

According to J. W. Briscoe, president, the new machine, with one attendant, is capable of producing 1,500 perfect Mortarless patented interlocking concrete block per day.

This Clark "Yardlift"—40, a 4,000-lb. capacity gas-powered fork truck with pneumatic tires, is equipped with Schmidgall concrete block forks and an Allen all-weather (side-opening) cab. It was designed for out-door operation over all types of surfaces. The Yardlift is a product of the Clark Equipment Company, Clark Tructractor Division.

• Air Meter

The Acme Air Meter was developed by E. W. Zimmerman and associates to meet the need for an instrument to check the air in air-entrained concrete. This



device reportedly gives an accurate determination of the exact percentage of air entrained in concrete or occurring in fines or coarse aggregates, as well as a determination of the yield.

The meter is made of magnesium alloy, which resists any chemical action which might result from contact with concrete. It weighs 22 pounds and is easily carried by its handle. An accurate reading can be obtained in about five minutes.

• Portable Batching Plants

Blaw-Knox Division of Blaw-Knox Company, Pittsburgh, Pa., describes its 2-compartment, 100-ton portable aggregate batching plant (Model P-2100) as one which with its dual-type weighing batchers can discharge two measured batches of aggregates simultaneously.

Its 3-compartment bin is arranged similarly for dual batching of aggregates. Dual batchers are also available for 2-material and 3-material bins, as well as dual arrangement for cement batching. All of these twin-type weighing batchers have only one set of scales and one beam box and are arranged for one-man operation.

Another related device offered by Blaw-Knox is an automatic cement feeder valve for the weighing of bulk cement. It permits the batcher to be located immediately beneath the cement bin opening and still obtain automatic weighing.

A larger portable bulk cement plant of new arrangement is available in capacities up to 800 bbl.

* M H is MASS HANDLING — the systematic movement of the most units, in the shortest time, at the lowest cost.

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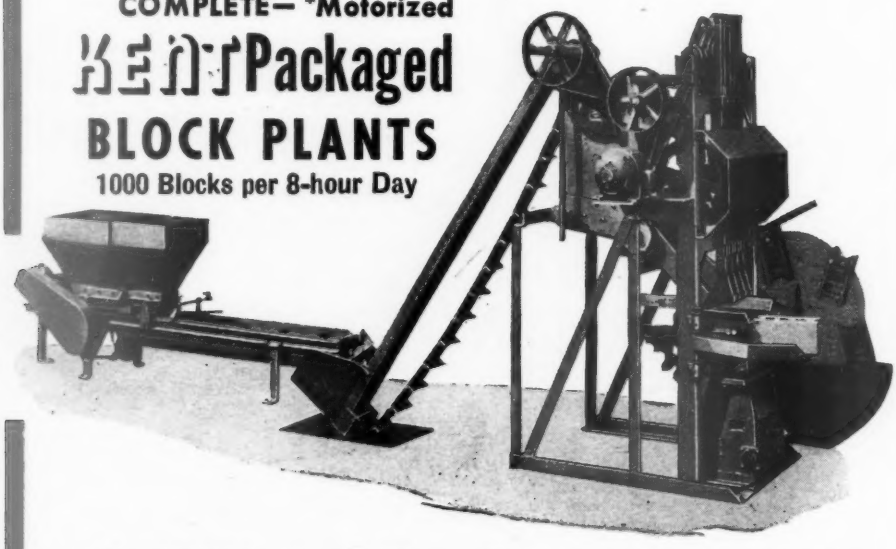

• The KENT Continuous Mixer delivers well-mixed concrete in a steady stream to the KENT Elevator which raises it to the KENT Feeder. From this the concrete flows into the easily operated KENT Stripper. The pull of a lever brings the KENT Tamper into operation for speedy tamping of dense block. The hopper "strikes-off" the blocks smoothly. It is then raised by an easily operated lever and swung to one side on the "take-off". At the right of the stripper stands the KENT Dunker which keeps pallets constantly in fine condition. Furnished with 1000 pallets, 25 three-deck curing racks and lift truck.

*Larger KENT plants are available; also units for belt drive and combinations having the KENT Batch Mixer, instead of the Continuous Mixer. Use the coupon below to obtain any desired information quickly and easily.

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☐ Plant illustrated above ☐ Plant with Batch Mixer

☐ Plant with belt drive ☐ Larger Complete Plants

Name..... Address.....

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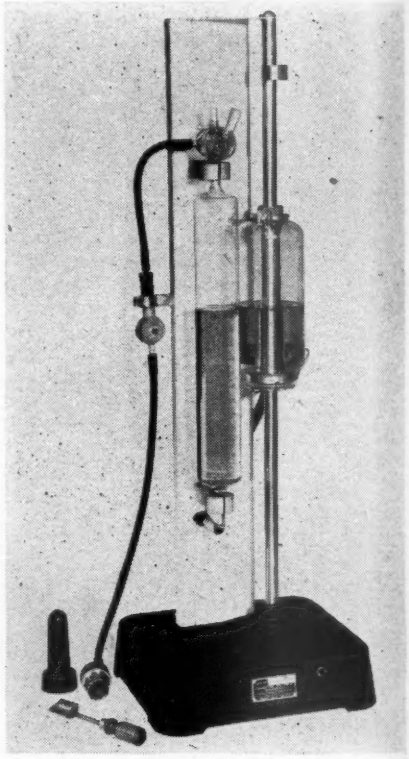
• Moisture Determinator

The "Leco" moisture determinator, a product of the Laboratory Equipment Corporation, is designed to measure the percentage of moisture in a variety of substances, employing a principle of generating acetylene gas by bringing the moisture of the sample to be tested into positive contact with an excess amount of calcium carbide. The quantity of gas



thus generated correlates with the percentage of moisture present.

The instrument consists of a substantial metal framework, a dust trap, hose connection, measuring buret with header, sliding leveling bottle mounted on a rod with self-locking sliding device and the rubber manipulating container for the sample. A portable model is also available. Operation is simple, and a determination is normally made within two minutes.

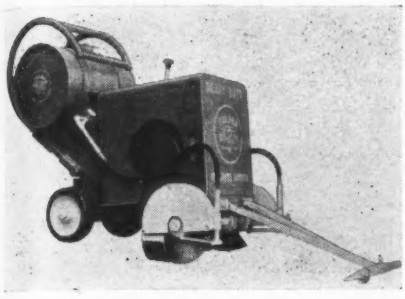
Louis E. Wettlaufer, 76, former president of the Niagara Concrete Mixer Co., Buffalo, died recently at his home at Windmill Point, Ont., after an extended illness. He was born in Canada in 1871. He retired from business several years ago due to illness.

Fred C. Wilcox, one of the best known authorities on ready-mixed concrete plant equipment, has accepted the position of New York manager of Moto-Mixer and Moto-Agitator sales for the Chain Belt Company of Milwaukee, Wis.

The Roy Darden Industries, Inc., Bona Allen Bldg., Atlanta, Ga., has been appointed sole distributor for Kay-Tite in the state of Mississippi. Kay-Tite is a protective coating for porous masonry.

• Cutting Machine

Felker Manufacturing Company, Torrance, California, announces a new concrete-cutting machine, the DI-MET. Equipped with a Fairbanks Morse Onan



2-cylinder, 10-hp. gasoline engine, an abundant reserve of power is supplied to the spindle. Due to this power, the speed of the wheel is not materially influenced by sudden changes in depth of cut or other causes of increased load.

The spindle is mounted in ball bearings and is double ended, permitting either right or left hand use of the cutting wheel.

In order to protect the wheel against sudden shocks when starting cuts, it is gradually eased into the work by a hydraulic down-feed retardant.

A large tank carries water which floods the wheel when in cutting position. A positive water turn-on operates as the blade is lowered, and shuts off when retracted.

The Felker DI-MET concrete cutter is especially designed for use with the Felker DI-MET segmented type diamond wheels. They are made of very stiff, tempered steel, with diamond sections made as inserts. The machine accommodates wheels up to 18 inches o.d., permitting a 6½-in. maximum depth of cut.

• Tower-and-Crane Unit

In an effort to add even more versatility and utility to its line of heavy construction equipment, Mixermobile Manufacturers announce the development of the new "Towermobile" crane. This new machine is actually a further development of their Towermobile, which has been manufactured since 1938.

The addition of the crane boom to the Towermobile chassis, without removal of the tower, gives the construction contractor a chance to perform a good many more operations with the same piece of mobile equipment. Originally the Towermobile was capable of being driven to the job, erected in a matter of 10 or 15 minutes by only one man, and hoisting concrete or other building materials. Now, this same operation can still be accomplished, but an operator also has a 20-ft. boom with a lifting capacity of 9,000 pounds on a line 7 feet to the rear of the truck chassis.

An unusual feature of this combination lifting-and-hoisting machine is the fact the tower can be completely removed from the chassis and set to one side by the machine's own boom.

Specifications of this new combination machine include a 20-ft. crane boom which can be increased in length in increments of 10 feet up to a maximum of 40 feet. Boom swing is 360 degrees and elevation is 85 degrees. Lifting capacity with standard boom is 9,000 pounds. The standard tower section is 35 feet high with one 10-ft. extension included which gives a hoisting height of 45 feet. Additional tower extensions are available, but guying of the tower is recommended over 55 ft. Lifting capacity of the tower section is 6,000 pounds. Accessories that can be used with the hoisting tower are a 1½-cu. yd. concrete hopper, or a 6- by 6-ft. materials platform.

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Contractors Mach. & Equip Co. Hamilton Ont., Canada
C. H. Jones Equip. Co. Salt Lake City, Utah
C. J. Rahn Co. Newark, N. J.
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Yes, for SAFER, FASTER, BETTER handling of concrete blocks—Truck-Man has what block manufacturers demand:

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- Easy lift and drop, soft start and stop—handles green blocks gently.
- Hydraulic lift and gasoline power—ease and speed handling.
- Cat-like maneuverability possible only with 360° steering.
- Easy on-and-off, simple and safe operation by unskilled drivers.
- Low first cost, low operating cost, low maintenance cost.

Ask the Truck-Man dealer in your territory about performance, service and economy, or write us for catalog.

a product of

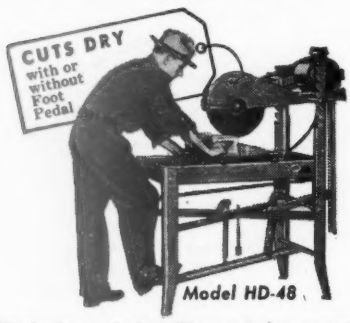
truck-man INC.

1422 West Ganson, Jackson, Mich.

FASTER CUTTING

WET or DRY with the NEW HD 48 CLIPPER Masonry Saw

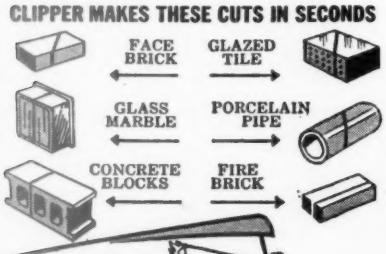
You'll be amazed how quickly and easily you can cut virtually any special length or shape from the hardest masonry materials. Clippers save time — save material, assure better workmanship on every job.



With the exclusive Clipper design, proven throughout the world and guaranteed to provide the fastest cutting speed and the lowest cutting costs.

DUSTLESS MASONRY CUTTING so fast and easy. Just turn on the circulating water system and slice through the hardest masonry materials. Foot Pedal control for varying material sizes or lock the cutting head at a set position, whichever is desired.

CLIPPER MAKES THESE CUTS IN SECONDS



FREE TRIAL
In keeping with our policy for the 10th consecutive year, you can have a Clipper on Trial. Clippers for Every Job priced as low as $195... write for Catalog, Today!

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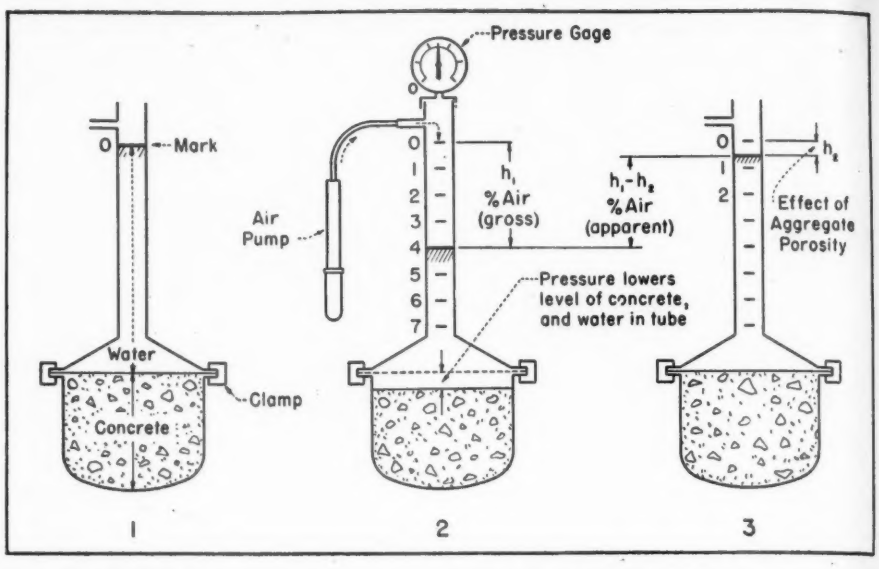


● Air Indicator

The Tarrant air indicator for determining the amount of air entrained in concrete is now being manufactured by the Robert Tarrant Manufacturing Company. Output has been taken by the Corps of Engineers and other government agencies.

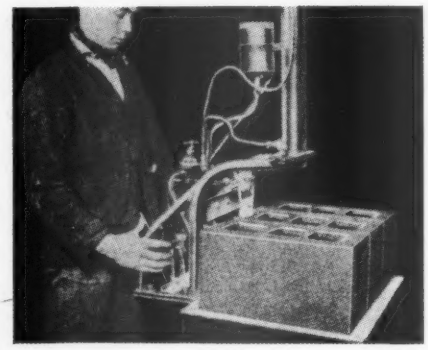
The device, based upon the Klein-Walker studies of entrained-air measurement by the pressure method, has a capacity of 0.44 cu. ft. and can accommodate aggregate up to 3-in. size. Fresh concrete is placed in the steel bowl, the cover is clamped on and the assembly is filled with water. Pressure is applied by a small air pump, compressing the air entrained in the concrete. The amount of entrained air is read as a percentage of the volume of the concrete.

As aggregate particles are usually porous, they contain air, which is included in the apparent air content and must be deducted to obtain actual air entrained by the pressure method. (See diagram.)

The indicator is provided with a cylinder of known volume with which the correct operating pressure can be determined and checked on the job.

● Block Stenciling Machine

Designed for easy installation, the "Yodermark" block and brick stenciling machine, offered by the Yoder Company, 5550 Walworth Avenue, Cleveland, O., is mounted on air-operated off-bearing



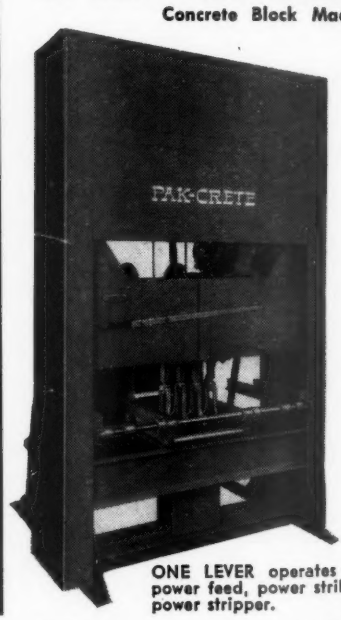
hoists with two bolts and a pressure clamp. As soon as connections have been made with the air line, the device is ready to go into operation.

The off-bearing operator presses a thumb lever as he removes the pallet from the machine, and the block is sprayed with the maker's name or trademark.

In making 12- by 16-in. units, every other block is marked; on 8- by 16-in., every third one; on 4- by 16-in., every sixth. This is considered sufficient for identifying lots.

The stenciling machine was originally developed by the Geist Coal and Supply Co. of Cleveland, O.

All the PROFIT ANGLES in the PAK-CRETE
Concrete Block Machine



ONE LEVER operates cycle of power feed, power strike-off and power stripper.

PAK-CRETE has priority with producers because it features pre-war durability plus post-war improvements.

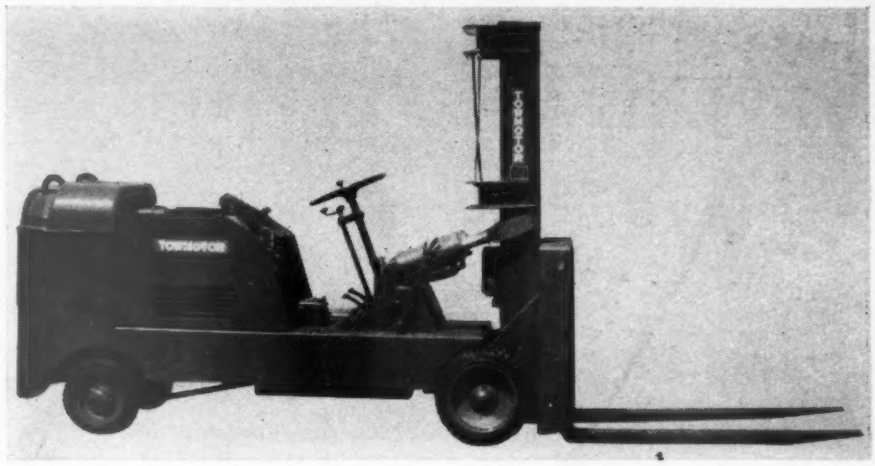
PAK-CRETE delivers 7000 short, power-controlled blows per minute, insuring high compressive strength blocks, low absorption, and less cement needed. Write for details.

COLLINS EQUIPMENT AND SUPPLY CO.
Box 811, Joliet, Illinois

● Heavy-Duty Lift Truck

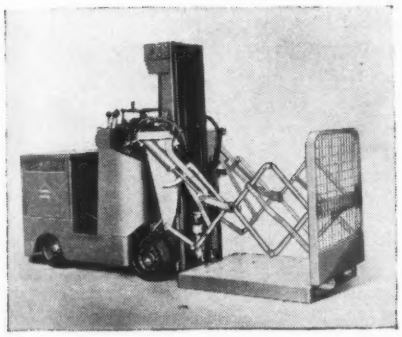
A new fork lift-truck, the Model LT-90, having a lifting capacity of 15,000 pounds, has just been announced by Towmotor Corporation, Cleveland manufacturer of fork lift-trucks, industrial tractors and fork lift-truck accessories. The LT-90 combines the flexibility inherent in fork lift-trucks with the greater lifting capacity required by heavy industries. (See illustration at right.)

The new model has been thoroughly field-tested by Towmotor. The LT-90 is similar in most respects to the nine other Towmotor fork lift-truck models and may be used in conjunction with the various accessories wherever special applications require.



● Pallet Retriever

Approaching the problem of reducing expenses in the use of pallets in shipping products, a pallet retriever attached to a standard fork-type truck has been developed by Elwell-Parker. With this

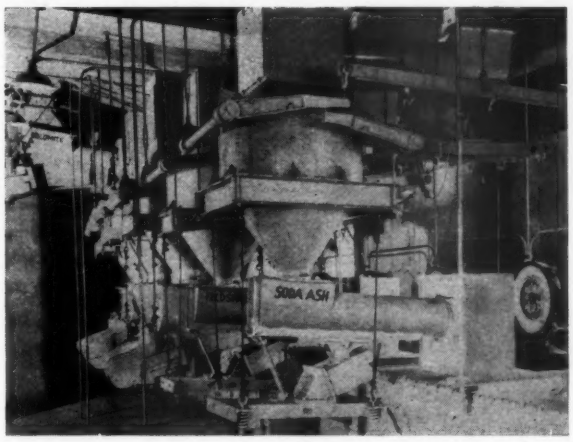


attachment, pallets may be used in the customary method for fast loading and yet remain in the owner's possession. Thus, the owner has practiacllly all the advantages of the truck-pallet method in his own plant and also in loading cars, without loss.

The accessory is attachable to the forward end of the truck. A load-han-

dling or stabilizing mechanism consists of two hypraulically-actuated pantograph-type rams.

These rams are self-adjusting to fit and follow the contour and vertical or lateral motions of the load, while the truck with the pallet backs away and withdraws the pallet from beneath the load. They can be operated in corners of box cars, since they may be actuated independently or together. No part of the mechanism at any height of lift projects across the mechanism or exit from the driver's station. The Elwell-Parker Electric Co., Cleveland, O.



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"Automatic"

BATCH WEIGHING

Provides ACCURACY OF BATCH

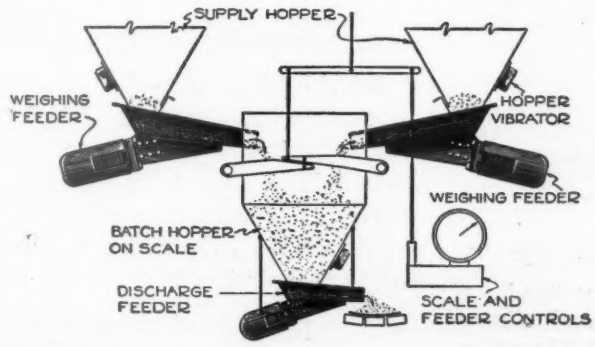
SIMPLE CONTROL

SELECTIVITY

SYNTRON Vibratory Feeders inter-locked with scale control permit the handling of any one, or a combination of any materials to be accurately and automatically batched at the same time.

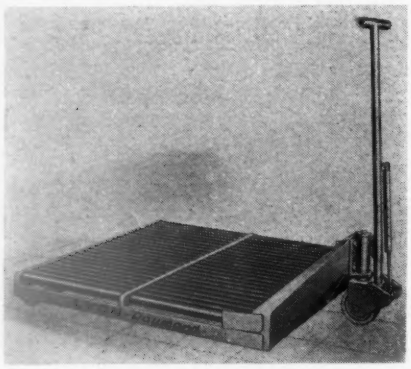
What is your problem? Write us about it.

SYNTRON CO., 385 Carson, Homer City, Pa.



● Truck for Switching Pallets

The problem of loading pallets inside a freight car and transferring them to a roller conveyor for movement to warehouse has led to the development of a special truck by materials handling engineers of Lyon Raymond Corporation.



This truck can be moved about inside a freight car or motor truck so that palletized loads can be made up from goods being received.

When the pallet is loaded, the truck is moved to the doorway, where a conveyor is set up leading to the warehouse. One side of the truck is lined up with the end of the conveyor and the pallet is easily pushed on the conveyor system, which carries it to the warehouse floor. There it can be handled and stacked by conventional fork trucks.

The Lyon-Raymond "Pallet Switcher" cuts costs since by its use the entire loaded pallet is moved at one time. Specifications of this truck, when designed to handle the standard 48-in. pallets, include a double row of rollers on 2-in. centers. The top is 48 inches square, and the truck is designed to handle loads up to 4,000 pounds.

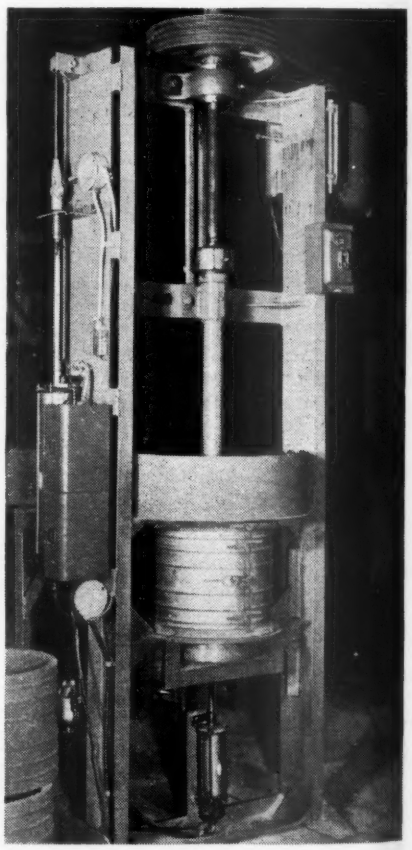
Hinged stops are provided so that the pallet cannot roll off the truck while it is being moved about. The handle is furnished with a self-contained holdup device.

● Concrete Tile Machine

The Parker-Banks "Tile-Master," manufactured by the St. Johns Tool and Die Co., at St. Johns, Mich., features all-steel construction and adjustable toggle clamps. According to the makers, the machine, manned by two operators, can turn out eight tile per minute. (Actually, ten tile per minute have been clocked frequently.)

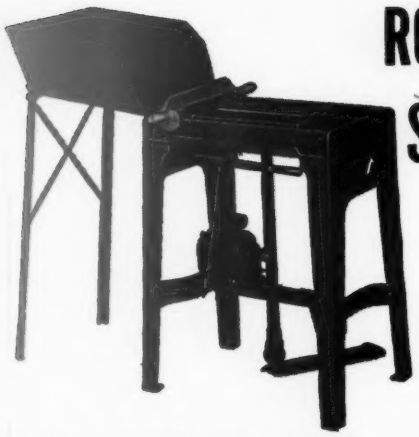
Made in two models, A and H, the Tile-Master is air-operated and is available either as a continuous-cycle or a semi-automatic machine. The semi-automatic type requires the pressing of one mushroom button for each tile made, an added safety feature.

In the A model, air equipment includes two Bellows Senacon Air motors, one hydro-check and all necessary switches. The two special features are the speed control adjustments on each movement of the packerhead and the timing of dwell at top and bottom of each cycle.



The Model H is the same as A, but here the traverse of the spindle shaft and die plates are controlled by hydraulic power.

BARTILE ROOFS and the Amazing BARTILE ROOFING MACHINE Are Sweeping the Country



All over the nation, builders are specifying BARTILE roofs because of their colorful, streamlined beauty . . . their permanence and resistance to fire, storm and the ravages of time. These advantages, plus the fact that BARTILE—the world's finest concrete roofing tile—costs little, if any more, than ordinary combustible or paper-like roofings, are responsible for the swing to BARTILE. The BARTILE Roofing Machine is a simple, sturdy machine that itself is low in cost. It quickly pays for itself. You owe it to yourself to get full details about this sensational profit-making machine without further delay.

★ *Bartile — the Product.* **These lightweight, strong, interlocking roofing tiles are made in a variety of fadeproof colors. Easy to apply, they require no nails or adhesives. Low in cost they last forever, require no maintenance expense ever. So attractive one job quickly sells another.**

★ *Bartile Roofing Machine.* **Simple to operate, an unskilled workman can, after a few days' practice, turn out up to one square (150 roofing tiles) per hour per machine. Each BARTILE machine is carefully designed and engineered for long, trouble-free service. Positive electric-motor vibration insures uniform high-strength tiles. Precision-made steel pallets make accurate units for perfect lay-up.**

FLASH!!! Los Angeles County Franchisee Orders 72 BARTILE Roofing Machines to Supply Insistent 1948 Demand for BARTILE Roofs . . . Your Territory May Still Be Available . . . Write or Wire for the Facts Today.

E. P. BARBER CO.
900 West Valley Blvd.,
Bloomington, California

Trade Notes

Harry E. Dunn

Harry E. Dunn, retired secretary of the W. E. Dunn Mfg. Co., died at his home at Holland, Mich., of a heart ailment on February 24 at the age of 61 years.

Mr. Dunn was born on a farm near Woodstock, Ontario, and spent the early years of his life in that community. In 1907 he became associated with his brother, W. E. Dunn, in Chicago. For 40 years he helped build the business from a three-man outfit, operating in the basement of a store building, to one of the world's leading builders of concrete products machinery. The firm moved from Chicago to Holland, Mich., in 1915.

Under Mr. Dunn's direction as engineer, the company made many contributions to the upbuilding of the concrete products business. Block machines of various models were supplemented by drain tile machines, pipe molds and a large range of ornamental molds. Later came the Duntile machine, then the roof tile (Duntex) machine and later the Dunbrik machine. Several of Mr. Dunn's more recent developments were either in the experimental or blue print stage at the time of his passing.

When a British company (Dunbrik, Limited) was organized in 1934, Mr. Dunn rendered valuable advice and cooperation in the building of the main factory near London, England, and in the establishment of various plants throughout the British Isles for the local manufacture of Dunbrik. As early as 1941 he quietly began to adjust the large factory at Holland for wartime conditions, so that through the next few years it was able to operate practically 100 percent on war contracts. Through this period he gave unstintingly of his time and energy; and it was not until new factory additions had been completed and the plant had been reconverted to peacetime activities that continued ill health made his retirement necessary.

W. P. Baranowski, sales manager of the Export Division of Clark Equipment Company, Battle Creek, Mich., is making a first-hand study of sales opportunities for Clark products in more than 15 countries from the Scandinavian peninsula to North Africa.

Mr. Baranowski is particularly interested in methods employed for handling material, in intra-plant movement, packaging and loading, and in stevedoring operations in order to appraise the potential market for Clark fork trucks, towing tractors and special handling attachments.

"DUMPCRETES PAY FOR THEMSELVES IN FOUR MONTHS"

That's the report from Indianapolis where the 10-million-dollar Windsor Village is going up in record time. Dumpcretes are pouring floor slabs, foundation walls and curb-and-gutter work with superior concrete.

Central-mix, air-entrained concrete is hauled 3½ miles in the low-cost, water-tight Dumpcrete. There is no segregation or bleeding, and the concrete is chuted right where needed and finished immediately.

Dumpcretes are doing a better job than truck mixers without the expense, and without idle time. The Monroe Corporation says, "Our concrete bodies are busy every day. When it is cold or wet, they haul sand and gravel."

Concrete men in 41 states are saving just like this with the Dumpcrete. You can too. Write today for 8-page booklet.

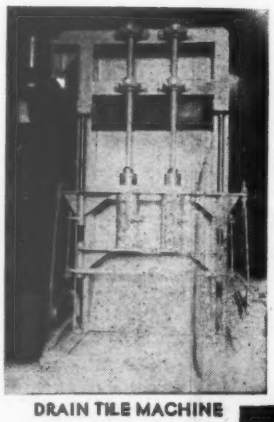
DUMPCRETE DIVISION
MAXON CONSTRUCTION CO., INC.
442 Talbott Bldg., Dayton 2, Ohio

The Dumpcrete Body

Lightweight, watertight, loads fast, dumps fast or slow, places anywhere, costs less to buy and run. Ideal for hauling aggregate, coal and earth.

• • •

*** Dumpcrete Concrete**
is central-mix air-entrained concrete hauled and placed with the speedy, low-cost Dumpcrete. Provides top-quality, plastic, workable and non-segregating concrete, saving up to $1.00 per yard.



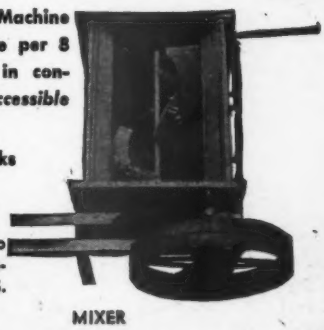
DRAIN TILE MACHINE

Write for Complete Information

HIGH PRODUCTION—LOW INVESTMENT

The Wooten Drain Tile Machine produces 2000 to 3000 tile per 8 hour shift. It is *rugged* in construction and *simple* and *accessible* in design. Price $685.00.

Delivery 2 to 5 Weeks



MIXER

WOOTEN MIXERS
Sturdily Built in Any Size to Meet Your Production Requirements. 9 Cu. Ft. Mixer $375.

C. M. WOOTEN CO. • 2717 Central Ave. Knoxville, Tennessee

F. Brainerd

Fay Brainard has been named to the newly created position of special assistant to Eugene Caldwell, general manager of the Hyster Company, effective March 1.

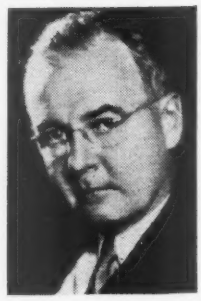
Mr. Brainard's new duties will be expediting projects in methods, inventory control, and similar fields. He has been plant engineer of the Portland plant since joining Hyster in 1942. He received his mechanical engineering degree from Oregon State college in 1941.

Svante Eikrem will assume the plant engineer position. He also received his mechanical engineering degree from Oregon State college in 1941.

Towmotor Corporation, Cleveland, O., has announced the opening of its new service and repair shop at 111-113 LeRoy Street, New York, N. Y. The shop is equipped to provide complete maintenance and major overhaul service, with factory-trained personnel supervising all operations, including steam cleaning and repainting work.

Truck-Man, Inc., formerly a division of Yard-Man, Inc., Jackson, Mich., has incorporated as a separate and distinct unit to carry on the manufacture of the Truck-Man, Model D, a gasoline-powered, hydraulic lift-truck. Yard-Man, Inc., continues to manufacture lawn mowers.

Officers of Truck-Man, Inc., are as follows: T. B. Funk, president; W. S. Butterfield, secretary and treasurer; Walter Mayer, general manager.



B. F. Devine

B. F. Devine, who has been associated with the Chain Belt Company of Milwaukee since 1909, has been elected a vice-president of the firm. For the last several years he has been manager of the Construction Machinery Division.

Mr. Devine is chairman of the Contractors Pump Bureau and is an active member of the National Ready-Mixed Concrete Association. He is also a member of the Mixer Manufacturers Bureau, the Truck-Mixers Manufacturers Bureau and the Associated Equipment Distributors; in addition, he was formerly a director of the American Roadbuilders Association.

Effective January 1, 1948, The Dewey and Almy Chemical Company, Cambridge, Mass., appointed John Williamson as distributor for Darex AEA, Air Entraining Agent, in the states of Michigan (lower peninsula), Ohio, Indiana, Kentucky, Tennessee, Alabama, Mississippi and Florida.

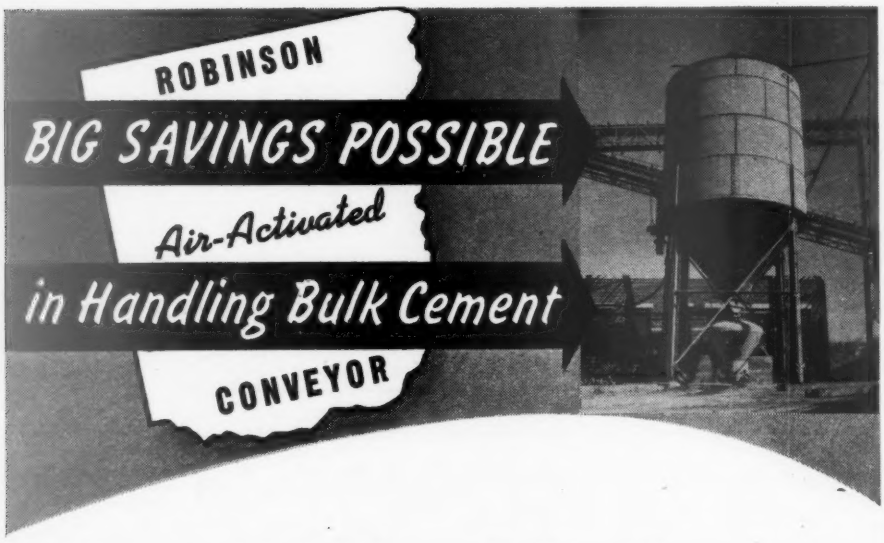
Mr. Williamson will operate his own company, known as J-W Materials, Inc., in Napoleon, Ohio. It is the successor to the Cement Products Division of Cataphote Corporation, Toledo, as distributor of Darex AEA in the above states.

The Chain Belt Company announces the appointment of Edward Ehrbar, Inc., 29 Meserole Avenue, Brooklyn 22, New York, as exclusive distributor of Rex Moto-Mixers in the city of New York, Long Island and the counties of Sullivan, Ulster, Dutchess, Orange, Putnam and Westchester.

Announcement is also made of the appointment of Dale & Rankin, Inc., 23 Sussex Avenue, Newark 4, New Jersey, as exclusive Rex Moto-Mixer distributors in the northern half of New Jersey.

Four-inch concrete drain tile is the product of a new industry in Gas City, Indiana, at the Whiteman Concrete Tile Works. William R. Whiteman, owner, designed and built the equipment.

Cle Elum, Washington, is the location of a new industry, the Cle Elum Cement Products Company, Inc., which is engaged in the production of lightweight cinder block. Jack Wans and August Petrich are the proprietors.



Is your cement storage bin 100 feet or more from the siding? Are there any obstructions between storage and siding regardless of distance to make mechanical handling impractical?

Look into the merits of the Robinson Air-Activated Conveyor. With it, you can get shipments in hopper bottom cars; unload each car in two hours or so; and operate season after season without heavy maintenance. Pipes do not clog because the cement does not encrust. There are no continuously moving parts, screw feeds, bearings, etc., that so frequently cause shutdowns and maintenance.

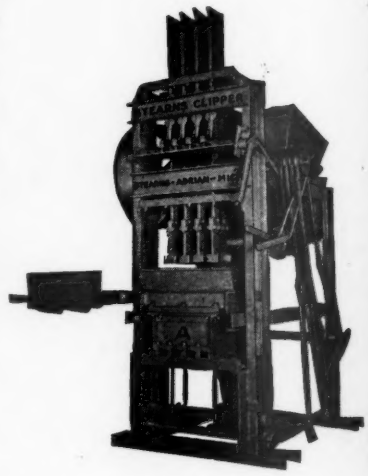
If you wish to save in costs for handling your bulk cement, investigate the Robinson System. Write to us.

ROBINSON Air-Activated CONVEYOR SYSTEMS

Division of
MORSE BOULGER DESTRUCTOR CO.

Representatives in Principal Cities

EAST 42nd STREET •• NEW YORK 17, N. Y.



The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press Steel Pallets. Straublox Oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager Columbus, Ohio